1/83 U2520-1.21 A

Population Reports

Series L
Number 3
November–December 1982

ISSUES IN WORLD HEALTH

Population Information Program, The Johns Hopkins University, Hampton House, 624 North Broadway, Baltimore, Maryland 21205, USA

Community-Based Health and Family Planning

Editors' Summary. Progress toward the goal of "Health for All by the Year 2000" requires new approaches. One approach now being emphasized is community-based distribution (CBD) and services. In CBD programs, lay workers from the community provide important services and supplies with minimal day-to-day reliance on clinics, professional medical personnel, or complex diagnostic, screening, and record-keeping procedures.

This approach is already being used with some success to deliver various primary health measures, including family planning. For example, in the last 12 years more than 70 community-based family planning programs have been undertaken in at least 40 countries. These programs vary greatly. They involve village leaders, women's clubs, traditional midwives, or local retailers. Local workers distribute condoms, oral contraceptives, and sometimes other items, either free of charge or for a small fee, sometimes on a household-to-household basis, sometimes through convenient community supply points. An objective they all share, however, is to improve access to family planning services by removing some of the geographic, financial, bureaucratic, cultural, and communication barriers that limit use of these or any health services. Greater availability is an important goal of all community-based services.

Criteria for CBD Services

Certain primary health measures are better suited to a community-based approach than others. For lay workers to be effective, CBD programs should focus on:

- common and important health problems of the community,
- health problems for which there are effective remedies,
- services and supplies that are relatively safe and easy to deliver.

Among the measures that have been considered and/or provided through CBD programs, in addition to family planning, are oral rehydration therapy for diarrhea (ORT), malaria treatment, intestinal parasite treatment, nutrition education and supplements, and immunizations. Each of these measures offers special benefits but each also raises special problems for CBD.

Oral Rehydration Therapy (ORT)

ORT is used to treat dehydration due to diarrhea. Diarrhea is extremely common among children under age five and a major cause of death. Although ORT does not prevent or cure diarrhea, it is effective and safe in treating dehydration if it is prepared and administered properly. Technically, ORT is simple. The oral rehydration solution can be mixed from prepackaged ingredients and water or even made with household sugar, salt, and water. Programmatically, however, ORT is demanding. Because too dilute a solution may be relatively ineffective and too strong a solution can be dangerous, CBD workers and village women need careful and repeated demonstrations and training. Moreover, mothers should be taught to continue breast-feeding and to give other liquids and food during diarrhea. Teaching the mixing and use of ORT requires more skills than teaching people to take a pill. Therefore close supervision of CBD workers is necessary. Despite these demands, ORT is a valuable CBD measure with the potential for saving many lives.

Treatment of Malaria

Malaria is endemic in many developing countries and may kill at least one million people annually, most of them in Africa. Community workers can use chloroquine and possibly other drugs to treat malaria. Single doses of these drugs lower fever, eliminate symptoms, and can cure the most dangerous type of the disease. Thus malaria treatment can have an important health impact. In areas where chloroquine is effective, treatment of acute cases of malaria is relatively simple, safe, and inexpensive. Because treatment produces immediate results, community interest is likely to be high. Preventive doses for all children and pregnant women may be even simpler than treatment but in the long run can reduce natural semi-immunity and encourage the development of drug-resistant organisms.

Intestinal Parasite Treatment

In many areas almost everyone is infected with intestinal helminths, or worms. Drugs to combat these parasites are rela-

CONTENTS

Primary Health Care and Community-Based Family Planning . . . . L- 79
Designing or Expanding a CBD Program . . . . L- 80
Single versus Multiple Services . . . . L- 82
Program Experience . . . . L- 85
Oral Rehydration Therapy . . . . L- 89
Treatment of Malaria . . . . L- 91
Treatment of Intestinal Parasites . . . . L- 92
Nutrition Measures . . . . L- 95
Immunization . . . . L- 97
Other Health Measures . . . . L- 98
Bibliography L-106

This issue of Population Reports was prepared by Adrienne J. Kols, M.A., and Maria J. Wawer, M.D., M.H.Sc., with the assistance of Wayne Quillin and Jennifer Kinsey on the basis of published and unpublished materials, correspondence, and interviews. Portions of this report are based on materials prepared by Maria J. Wawer for the Workshop on Family Planning and Health Components in Community Based Distribution (CBD) Projects, sponsored by the Johns Hopkins University and the United States Agency for International Development, held at Charlottesville, Virginia, USA, January 12–14, 1982, and on additional background material. Comments and additional material are welcome.

The assistance of the following reviewers is appreciated: George H. Beaton, Richard A. Cash, J. Jarrett Clinton, Stanley O. Foster, Saad Gadalla, Duff Gillespie, Ronald Gray, James R. Heiby, Louis Hellman, Albert Henn, Teresa J. Ho, Sandra L. Huffman, John F. Kantner, Jay S. Keystone, Eilif Liisberg, Michael Merson, Ronald W. O'Connor, Richard Osborn, Robert L. Parker, Malcolm Potts, Reimert T. Ravenholt, Roger Rochat, Allan Rosenfield, J. Joseph Speidel, Gayatri Suryaningsih, Anne Tinker, Joe D. Wray, and Marian Zeitlin. Some reviewers read portions of the manuscript; others, all.

Population Reports (USPS 063-150) is published bimonthly (January, March, May, July, September, November) at 624 North Broadway, Baltimore, Maryland 21205, USA, by the Population Information Program of the Johns Hopkins University and is supported by the United States Agency for International Development. Second-class postage paid at Baltimore, Maryland. Postmaster to send address changes to **Population Reports**, Population Information Program, The Johns Hopkins University, 624 North Broadway, Baltimore, Maryland 21205.

Population Reports is designed to provide an accurate and authoritative overview of important developments in the population field. It does not represent official statements of policy by the Johns Hopkins University or the US Agency for International Development.

Phyllis T. Piotrow, Ph.D., Director; Walter Stender, Associate Director; Ward Rinehart, Editor.

tively inexpensive, quick-acting, and easy to administer either to a whole village or to specific groups. Thus CBD programs have found substantial community support when antiparasite programs are started.

Although common, worms rarely lead to serious illness or death. Thus, the health impact of antiparasite medication, compared with other CBD measures, has been questioned. Furthermore, reinfection usually occurs after four to six months unless regular treatment continues or sanitation improves markedly. As a result, community interest may diminish as repeated treatment is needed. Thus it is not clear that treatment of worms should have high priority in CBD projects. If it is included, antiparasite medication might best be reserved for those who specifically complain about worms in their stools.

Nutrition Measures

Poor nutrition occurs worldwide, especially in impoverished areas. CBD programs have sought to deal with two nutritional problems—(1) insufficient protein and calories and (2) specific vitamin and mineral deficiencies. Diet supplements of protein and calories have been used extensively, but the results are difficult to measure. Food supplements do not always reach the women and children who need them most, or else they substitute for other food. In addition, protein-calorie supplements are expensive and raise logistical problems for CBD programs. Some programs weigh infants regularly to alert families to infant nutritional needs. This form of nutrition education may be useful, provided families have enough food to give more to a poorly nourished child, but most of these programs have not been thoroughly evaluated.

Although insufficient food is by far the greater problem, CBD programs can deal more effectively with deficiencies of specific vitamins and minerals. CBD workers can distribute vitamin A capsules to children every four to six months to prevent eye problems. Iron and folate supplements should be taken every day and their lack of obvious effects may make compliance a problem. It may be feasible, however, for CBD programs to distribute these supplements to pregnant women. In areas of iodine deficiency, CBD workers can cooperate with mobile injection teams or distribute oral doses of iodine to prevent goiter and cretinism.

Immunization

Immunization against diseases such as diphtheria, whooping cough, tetanus, measles, and polio has a substantial impact on health, but immunization programs are too complex for most CBD efforts. The main problem is that vaccines must be kept refrigerated at a constant temperature or they lose their effectiveness. Furthermore, with some vaccines, once a vial is opened, the contents must be used that day. Waste can be enormous. Vaccinating each child three times at the proper intervals during the first year of life further complicates logistics. CBD workers can play an important supporting role in immunization programs, however. They can encourage women to have their children vaccinated and to be vaccinated themselves. They can also coordinate and publicize the visits of the immunization teams, which can be the occasions for delivering a variety of primary health care services.

Problems of Implementation

Regardless of which measures are undertaken or in what combinations, the most difficult tasks in a CBD program are likely to be recruiting and training workers, providing continued supervision, coordinating backup with the existing medical system, keeping supplies flowing, and evaluating the program and revising it as needed. Lack of sufficient attention to these problems has limited the impact of many CBD programs.

Experience to date, in more than three dozen combined family planning and health CBD programs, is limited and inconclusive, but a few basic lessons stand out concerning integrated programs:

- CBD projects should avoid a service overload, in which community workers with limited training are expected to learn and do more than they can.
- New activities should be phased in on a step-by-step basis so that both workers and users learn each measure thoroughly before another is introduced.
- Training and supervision must be a continuing part of any CBD program.
- Community participation is desirable—through village leaders, women's groups, or other organizations. Also, communities must eventually share the cost of primary health care through fees or other means.
- Combining family planning with other health services has not proved necessary to make family planning acceptable at the community level, but combined efforts may help meet other primary health care needs.
- Operations research is needed to discover how best to design and implement an integrated CBD program. In the meantime, program managers must be alert and ready to respond to problems as they arise.

End of Editors' Summary.

PRIMARY HEALTH CARE AND COMMUNITY-BASED FAMILY PLANNING

> ***Primary Health Care is essential health care made universally accessible to individuals and families in the community by means acceptable to them, through their full participation and at a cost that the community and country can afford. It forms an integral part both of the country's health system of which it is the nucleus and of the overall social and economic development of the community. (423)***

The goal of achieving "Health for All by the Year 2000" was adopted by the World Health Organization (WHO) at the Alma-Ata meeting of 1978 (423). Although specific services provided will vary in different countries and communities, at least eight basic components are part of primary health care:

- education concerning prevailing health problems and the methods of preventing and controlling them;
- promotion of food supply and proper nutrition;
- an adequate supply of safe water, and basic sanitation;
- maternal and child care, including family planning;
- immunization against the major infectious diseases;
- prevention and control of locally endemic diseases;
- appropriate treatment for common diseases and injuries; and
- provision of essential drugs (423).

How, in fact, are these services to be made universally accessible with full community participation at an acceptable cost? One approach being tried increasingly is community-based distribution (CBD). A number of public health programs have experimented in delivering simple, practical health measures through a community-based approach. The use of barefoot doctors in China is a widely known example of this strategy (84, 333). CBD programs have four essential features:

- Community residents who are not health professionals deliver the supplies and services.
- The programs deliver services to each community or even each household and do not depend on clinic attendance.
- CBD workers operate relatively autonomously, without direct day-to-day supervision.
- Many diagnostic, screening, and record-keeping procedures, although desirable, are omitted because they are not practical for community workers.

Clinics and medically trained personnel provide necessary backup and referral, but they are not the main source of services and supplies. With family planning, for example, the CBD workers usually distribute pills and condoms and refer people to backup services for IUDs and voluntary sterilization procedures (see **Population Reports**, *Community-Based and Commercial Contraceptive Distribution: An Inventory and Appraisal*, J-19, March 1978).

CBD increases access to services and supplies in four ways:

- by overcoming geographical barriers—People are often unwilling or unable to go more than a few kilometers for contraceptives or preventive health measures (454).
- by overcoming cost barriers—Services are provided free or for a minimal charge, so no one is excluded for lack of money.
- by eliminating bureaucratic barriers—CBD minimizes long waiting lines, lengthy forms, and limited hours of operation that are typical of clinics and that discourage even those who live close by from attending.
- by overcoming cultural and communication barriers—CBD makes households aware that the services are available and provides them in ways that are acceptable in the community (122, 238).

These same improvements in access to services are cited in the Alma-Ata Declaration in describing the role and objectives of primary health care (423).

Family Planning CBD Experience

Family planning is one of several primary health measures that can be delivered safely, effectively, and cheaply through community-based services. Family planning CBD programs began more than a decade ago. While at first they were considered a radical departure from traditional, clinic-based services, now the concept is widely accepted. The first programs were initiated by PROFAMILIA, the family planning association in Colombia, in 1971; by BEMFAM, the family planning association in Brazil, in 1973; by the American University of Cairo and the Family Planning Association in Egypt in 1974–75; and subsequently by other private groups in a number of countries including Sri Lanka, Thailand, South Korea, Guatemala, and Egypt (122, 171).

Over 70 family planning CBD programs have now been developed around the world (122, 132, 171, 384). While all exhibit the four essential features of CBD, these family planning programs, like other health CBD programs, vary in a number of ways:

- **Supplies and services.** Most provide family planning supplies such as oral contraceptives and condoms; some also provide spermicides, give contraceptive injections, and offer instructions in Natural Family Planning. Many also provide referral for medical services such as voluntary sterilization and IUD insertion.
- **Fees.** About half of current CBD programs charge a small fee for supplies; about half provide them free of charge. Some programs that charge a fee use commercial retail outlets and are described as social marketing. (See box, p. L-94, and **Population Reports**, *Social Marketing: Does It Work?*, J-21, January 1980.)

CBD workers take health care out of the clinics to each village or household. Here a health *promotora* in the Dominican Republic visits a neighbor in her home to offer services. (USAID/K. Chernush)

- **Means of delivery.** Some use door-to-door household delivery—a "sweep" approach—either once or repeatedly. Others depend on workers living in a village who establish depots and provide supplies on request. Some start with household delivery and offer resupply from depots.
- **Single-purpose or integrated.** Most family planning CBD programs began as single-purpose contraceptive distribution programs. There are also single-purpose health programs, providing, for example, oral rehydration therapy (ORT) for diarrhea. Some family planning programs have expanded to include other health measures. Some health CBD programs have expanded to include family planning.
- **Government or private.** Most CBD programs were started by private voluntary agencies, often with support from the International Planned Parenthood Federation (IPPF), but governments increasingly provide medical backup and partial funding. In some cases they have directly sponsored social marketing and village CBD projects.
- **Research component.** Some programs, usually with foreign donor support, have substantial research components. Others have grown so large that even minimal data on users and costs are difficult to maintain.

While it is difficult to compare the results of different programs, evidence from various sources suggests that family planning CBD programs have contributed to primary health care by making services more widely available. In Latin America and the Caribbean, for example, eight family planning associations reported that more than half of all new users—or almost half a million people—were supplied by CBD programs in 1981 (173). In eight northeastern states of Brazil, some 3,000 volunteer community-based distributors recruited over 200,000 new acceptors in 1981 (96, 173). Direct costs per year's supply of oral contraceptives distributed are estimated at $5 to $16 (US) excluding overhead, central staff, and government medical backup (305).

In 15 operations-research projects funded by the US Agency for International Development (USAID), contraceptive use increased by an average of 15 percentage points following CBD activities over periods ranging from four months to five years (384). Condom distribution has increased substantially in at least nine countries as a result of subsidized, social marketing programs (see **Population Reports**, *Update on Condoms—Products, Protection, Promotion*, H-6, September-October 1982).

It is, therefore, well-established that community workers with limited training can play an important role in meeting family planning needs. In pursuit of "Health for All by the Year 2000," the same type of workers and sometimes even the same individuals may provide a wide range of other health services as well.

During the 1960s and 1970s many primary health care projects were established around the world to extend services to poor and rural areas. Like family planning programs, they have experimented with many new types of auxiliary workers, including community-level workers with relatively little training (473). Mobile health units, itinerant workers, village health posts, and home visits have all been used. The services provided sometimes include the treatment of injuries and communicable diseases, prenatal and obstetrical care, immunizations, and health and nutrition education (17, 20).

Among the major points to be considered in developing community-based health services are:

- What specific services can community workers with limited training and supervision provide?
- To what extent can services be combined so that the same worker provides more than one type of supply or health care service?

DESIGNING OR EXPANDING A CBD PROGRAM

In selecting health measures appropriate for community-based delivery—either as a first step or in addition to family planning or other health measures—at least three points must be considered. CBD programs should focus on:

- common and important health problems of the community,
- health problems for which there are effective medical solutions,
- services and supplies that are relatively safe and easy to provide and to use.

Community Health Needs

Determining which health needs are most important is difficult because different measures of need can produce different conclusions. For example, Julia Walsh and Kenneth Warren have tried to develop a systematic definition of need based on three criteria:

- prevalence and incidence,
- severity of the illness or associated disability, and
- risk of death (389).

Some problems, such as malaria, rank high by all three criteria, but most do not. In practice, illnesses that cause disabilities, such as polio, must often be judged against illnesses that cause deaths, such as neonatal tetanus (10, 50).

Public health professionals often give priority to measures that reduce morbidity and mortality because they are accustomed to gauging health and the impact of health services in terms of these measurable indicators (389). In contrast, local residents may be more concerned about less serious problems that occur frequently, such as headaches, coughs, and colds. Villagers may not even recognize the existence of some pervasive and serious problems, such as malnutrition (112). If a program limits itself to problems judged important by outside medical experts and ignores local opinion, people may not be satisfied with or use the services offered (50, 355).

One way to balance conflicting demands is to try to combine measures that have substantial public health impact with popular measures. For example, in the Danfa Comprehensive Rural Health and Family Planning Project in Ghana, treatment of intestinal worms and "waist pains" (lower back and lower abdominal pains) was added to the village health workers' duties at the request of village representatives (204).

Public health professionals and local community members also may disagree about which sex or age group most needs health services. Health experts often want to provide services for infants and young children, since they are at greatest risk of sickness and death and in large part they suffer from easily preventable diseases (388, 389) (see Table 1). By contrast, village leaders may be most sensitive to the health needs of their own group—that is, adult males, who, after all, are seen as the economic mainstay of the community (10). With respect to many problems, such as malaria, however, community sentiments and public health experts may agree.

Sometimes it is not clear who speaks for the community or what "the community" really is (457). Where there is a strong local government structure, as in Indonesia, the lowest administrative unit may be able to take on substantial responsibilities in identifying and supporting health measures. In some cases, social groups, such as the Mothers' Clubs in South Korea, may want to decide on and carry out various activities (430). Where there are no appropriate governmental or social units, project managers may need to set up a representative local group to express people's concerns and help administer the program (16, 142, 457).

Medical Feasibility

Clearly, CBD programs can address only health problems for which medical solutions exist. A vaccine against schistosomiasis or a reversible, once-a-year contraceptive pill would probably be valuable and popular in any CBD program, but they do not currently exist. The less effective the existing medical technology is, the more education and behavioral and environmental change are required of the community to achieve a major improvement in health. CBD programs, using workers with limited training, should concentrate on technologies that have been proved effective and are simple to use.

Feasibility for CBD

Even when a major health problem is identified and an effective drug, vaccine, or other therapy exists to treat it, the feasibility of using a CBD approach depends on several additional factors, including:

- the complexity of diagnosis,
- safety and side-effects of treatment, including problems that may occur if mistakes are made, and
- logistics.

Table 1. Causes of Death Among Children Under Age 5 in Selected Rural Areas of Developing Countries

			% of Deaths Due to:				
Country (Area)	Ref. No.	Year	Diarrhea	Malaria	Measles	Tetanus	Other
Bangladesh (Matlab)	83	1975–77	27	NA	7	16	NA
Bolivia (Viacha)	296	1968–70	22	0	16	0	62
Brazil (Ribeirão Prêto communities)	296	1968-70	29	0	3	0	68
El Salvador (Apopa, Nejapa, Quezaltepeque)	296	1968–70	52	0	5	3	41
Ghana (eastern regions)	140	mid to late '70s	35*	11	37	6	11
Indonesia (East Java)	140	mid to late '70s	62*	0	13	9	16
Jamaica (St. Andrew)	296	1968–70	17	0	0	1	82
Nepal (terai)	140	mid to late '70s	37*	0	11	18	34
Pakistan (Punjab)	140	mid to late '70s	38*	1	43	5	13

NA = not available

*Includes malnutrition, which is more often a contributing factor than a direct cause of deaths.

In Zaire a member of the PRODEF project staff explains the CBD project to the community and shows an Oralyte packet. The involvement of community members can be essential to program success. (Maria Wawer)

A major issue is whether workers with limited training can accurately diagnose the health problem. Before curative care is provided, some diagnosis or presumption of the cause of the illness must be made. Diagnosis of some diseases, such as tuberculosis, can require sophisticated testing or the recognition of subtle clinical signs (156). These may be beyond the capabilities of many CBD programs and workers. The ideal health measure for CBD is one that does not require any diagnostic decision. This includes mass treatment or preventive programs (aimed at vitamin A deficiency, for example), treatments for obvious conditions (such as ORT for diarrhea), and family planning, where a personal or family decision, not a diagnosis, is all that is necessary.

The safety of the treatment is equally important, since CBD workers may make errors in administering drugs (131). Ideally, any medicine dispensed should have little or no potential for harm even if misused (346), but of course such treatments are few. Drugs with simple dosage schedules and treatment regimens are best because workers and clients will make fewer mistakes. Check lists, like those used in distributing oral contraceptives, may aid CBD workers' memories.

The worker's ability to diagnose and treat a disease correctly also can be affected by the incidence of the disease. CBD workers need to see conditions fairly often in order to practice and so maintain their skills. Robert Parker has estimated, for example, that CBD workers need to see at least a dozen cases of pneumonia a year to maintain their competence. In the small population that the average CBD worker serves, only the most common diseases may occur often enough (275).

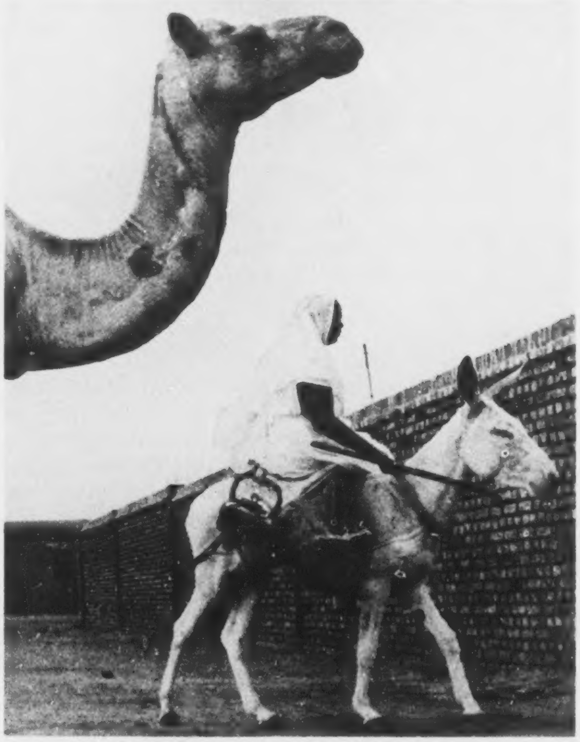
The logistics of a particular CBD program will fit some health measures better than others. In some programs the worker is based permanently in the village and so is always available to the villagers. This allows the worker to treat acute conditions routinely and to carry out treatments that require repeated visits. In other programs workers cover larger areas, making sweeps of all households. This system allows workers to offer treatments with long-term effects, such as vitamin A, or to introduce a health care measure and refer clients to community depots for further supplies or information.

Certain health measures may require logistical support that is beyond the capability of a CBD program (274). Immunization, for example, requires expensive refrigeration equipment for the vaccine, repairmen and spare parts to keep that equipment operating, and an efficient supply system to get the vaccine from the central warehouse to the villages while it is still potent—difficult assignments for any program (18, 103, 270).

SINGLE VERSUS MULTIPLE SERVICES

To what extent can services be combined so that the same worker provides more than one commodity or health measure? The relative merit of single-purpose, vertical programs and integrated, multipurpose programs is a long-standing issue in organization theory that is not unique to either health care or family planning. Ever since specialization and differentiation emerged as important elements in the development of modern society, the counterarguments have been made that overly specialized and differentiated services are expensive, inefficient, and ignore the interrelated nature of human needs (278).

In the field of family planning specifically, as a recent Asian regional conference pointed out, "It is generally believed that integrated programs increase the efficiency, effectiveness, and acceptability of services" (380). It has been argued that some people will be more likely to use contraception if family planning messages and supplies come from a worker who also provides health services (364, 394). Health care services will be much in demand and, according to this argument, the worker who provides them will be welcomed and trusted (188, 200). Similarly, family planning is thought by some to be politically more acceptable when offered in the context of health services (186). It is also argued that integrated services will be more cost-effective than separate services because they can avoid duplication of equipment, supplies, and administration and prevent competition for personnel (394). Based on these and other rationales, a number of integrated family planning and health programs have been proposed (184, 307, 365), and some have been undertaken.



In the Community Based Health and Family Planning Project in Sudan, trained village midwives, like this woman, introduced ORT, family planning, and nutrition education in three separate rounds of household visits, using a step-by-step approach. (UNICEF/Almasy)

Program Research Inconclusive

Some research projects have specifically tried to test the arguments that integration will increase contraceptive use or will be more cost-effective in terms of family planning. They have compared areas served by integrated programs with areas served by family planning programs only (see Table 2, pp. L-99–105). The results are inconsistent and inconclusive. The studies all have methodological problems, including small size, exceptionally large outside involvement, short time spans, and noncomparable study areas. For example, in reviewing experience in Bangladesh, a seminar conducted by the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) concluded:

> One of the most extensive and carefully evaluated projects in which integration has been assessed is from Matlab Thana in Bangladesh. This showed clearly that an integrated approach produced about three times the acceptance of a simple mass contraceptive delivery approach. The integrated approach, however, included a number of different elements. Staff were more carefully recruited, trained and supervised; clients were given fuller counselling; a larger variety of contraceptives was offered; and the fieldworkers provided minimal health services along with family planning. Thus, it is impossible to determine whether the increased programme performance was the result of the integration or of simply working a better job of the family planning service alone. (380)

Two of the largest and most sophisticated experiments, the Narangwal project in India and the Danfa project in Ghana, did not provide clear evidence that integration of services was the factor primarily responsible for program results (131, 259, 380). This was the case even though both projects concentrated substantial resources on small areas to an extent no national program could afford. Extensive reviews by ESCAP (380, 381, 382) of the considerable experience in Asia, where family planning programs are numerous, long-term, and effective, conclude that "the belief that integration leads to more efficient and effective programs is as yet unsupported by systematic research" (380).

Certainly it has not been demonstrated that family planning programs are unacceptable or will not be used unless combined with health or other social services. Whether family planning and health services should be operated together or separately or both depends upon which way will be administratively and politically most feasible and effective.

Likewise, the more general question of single versus multiple services has no one answer. It is clear that health problems are not sharply differentiated. Families need prenatal care, help in caring for sick children, medication for endemic diseases, family planning, and many other services. Therefore integration of service delivery may help to meet real individual and community needs. At the same time, administrative difficulties with integration may sometimes argue for separate, independent programs (480). A comprehensive health project in Afghani-

FINANCING CBD PROGRAMS

Funds for CBD and/or primary health care programs come from three sources:

- the national health budget,
- grants from foreign donors, including government agencies and private voluntary organizations,
- payments and contributions from the local community, including fees for service (434).

Most programs rely on a combination of sources, since each source has some limitations. National health budgets cannot meet all health needs. Moreover, ministries of health may be committed to supporting clinic- or hospital-based services and paying the salaries of professional health care personnel (17). Thus they may be reluctant to assume the cost of CBD programs and payments for a large cadre of nonprofessional workers. Grants from donor organizations are often intended to operate demonstration projects of limited duration or to meet initial rather than recurring costs. Foreign and international donors do play a special role, however, in supporting research projects needed to identify and solve problems (354, 413), but this funding may stop when the research is finished.

Thus it is increasingly recognized that over the long run communities must help support their own health services (361). CBD programs commonly draw on local resources in four ways, but each has drawbacks. First, many projects rely on part-time volunteer workers (see Table 2, pp. L-99–105). These volunteers often do not find their new status an adequate reward for their time and labor, however, and may not continue without some form of payment (17, 60, 234). Second, some workers charge clients a fee for their services. Fees for health services are familiar to most people, but those in greatest need are often least able to pay (354). Furthermore, many people are reluctant to pay for preventive services or health education (20, 354), despite their importance. In practice, however, some individual workers may decide to reduce or omit fees for those who cannot afford them. Third, the drugs may be sold to the clients at cost or at a slight profit. In addition to limiting availability, this may pose a problem when workers receive part of the proceeds as a commission: they may concentrate on selling drugs and neglect educational activities (64, 130, 346). Fourth, a small sum can be collected annually from each household by the local government unit as an insurance premium. Virtually all residents must participate if this scheme is to be equitable (354). Any form of communal rather than individual payment requires a well-organized local government or community structure. No matter how the money is raised, poor villages may not be willing or able to support the full costs of a CBD program (129, 346, 369).

Another financing method is for CBD programs to raise money from nonhealth activities. The Thailand program under the leadership of Mechai Viravaidya has experimented with marketing agricultural products directly to consumers. Bypassing the usual middlemen in this way increases the farmers' income and gives the CBD program a profit. Profit-sharing animal husbandry schemes and interest on loans for latrine and well construction also provide income for the program (477).

In practice, CBD programs have found it difficult to obtain substantial financial support from the community. Community financing has proved useful in paying for drugs and village workers, but it has rarely paid for training, evaluation, transport, supervisory staff, or project management (354). While self-sufficiency is a goal of many programs, most programs—and especially rural projects—have not reached that goal and need to give more attention to it.

The costs of CBD programs of course vary greatly depending on the services offered, whether workers are paid or volunteer, whether delivery is through house-to-house visits or depots, the age of the program, and other factors. CBD family planning programs, for example, have ranged in cost from over $70 (US) per new user in a Tunisia household distribution research project to $3-5 per new user in a Brazilian service-oriented depot-based program (132). By comparison, social marketing costs have ranged from $2 to $24 per new family planning user (15). Costs for clinic-based family planning programs are usually higher, ranging from $13 to $88, according to a recent overview (132).

stan found that vertical programs were more successful than integrated ones because there were "distinct levels of authority and responsibility at each level" (344, 345).

A variety of forms of integration are possible. For example, programs may be integrated at the administrative and/or supervisory level but employ different workers for different tasks. Conversely, each worker may deliver several services, with each service administered by a separate unit. Or they may be integrated at all levels. Studies suggest that organizations delivering services, especially in rural communities, can increase productivity by cooperating and sharing tasks at the village level, even if the organizations are vertically organized, single-purpose programs with separate budgets (13, 259). Overall, there is little evidence on which to base a final conclusion. In each case the appropriate degree of integration and cooperation to achieve an effective service program appears to depend more on the capabilities of the individual worker and the particular delivery system rather than on any theoretical considerations of efficiency or acceptability.

Overloading of CBD Programs

A major concern in CBD programs is described by public health experts as "overloading the system." CBD programs, which depend on workers with limited training and supervision, may be especially vulnerable to overloading. Field experience suggests that any of a number of health measures may be feasible for a CBD program when offered individually, but that efforts to deliver several of these services together multiply the difficulties. When programs are overloaded with too many or too difficult tasks, even the easiest health measures may not be implemented properly. Little research on CBD programs has yet focused on the overloading problem, so there are few experimental data to support these observations. The impression is widespread enough to warrant serious consideration in program design, however.

Overloading seems to depend on at least three factors: the number of measures implemented, the types of measures implemented, and the organization of the program. Starting a

LESSONS FROM ASIAN PROGRAMS

A 1981 regional seminar organized by the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) reviewed evaluations of integrated family planning and health programs. The seminar concluded that four major lessons, as quoted below, can be learned from the experience with family planning programs in the ESCAP region.

- There are many types of integrated and non-integrated family planning programmes in the region. There has also been much success in reducing fertility. But it still remains unclear whether any forms of integration have an impact on programme performance or what kind of impact they have.
- Family planning programmes in the ESCAP region have shown considerable success. This success is at least in part associated with two operational strategies. One is the use of specialized family planning agencies, which maintain unitary administrative lines from field workers to high bureaucratic levels. The second is the extensive efforts of these specialized agencies to develop effective linkages with a wide variety of other specialized services.
- There are also a few cases where administrative structures have been integrated, especially where family planning has been made an integral part of the government health administration services. Success in this area comes largely from using the existing health network to increase the contact points with the local population. This type of integration is organizationally more complex and more demanding; it especially requires long and careful planning, in which all participating specialized services are involved.
- The thrust for integration has often come from specialized family planning groups seeking to broaden their goals from family planning or fertility limitation to family health and welfare. This has also led to increased interest in developing higher levels of community participation to promote the welfare of the family. These developments to broaden goals and services have generally produced more effective integration than have externally produced standardized integration packages. (380)

number of different health services at the same time can strain every element of a project, including finances, logistics, management, supervision, training, and record-keeping (131, 260). Different measures will put more or less pressure on different parts of the system, however. Thus, ORT and family planning require more worker training, while protein-calorie supplementation and immunization make greater demands on logistics. An existing CBD program considering new services might prefer those that make demands on different resources than do current services. This would prevent overloading any one element of the program, such as transportation or personnel. Planners designing a new integrated CBD program need to consider the same question and be especially sure that heavily burdened program elements receive sufficient resources. The number and type of services that can be delivered varies from program to program. For example, the length of training sessions and the amount of supervision will affect how much the worker can handle Local climate and geography influence the capacities of storage facilities and distribution networks.

In a CBD program the village workers are probably the program element most vulnerable to overloading. Training usually must be short because of costs and time available. If taught too much too quickly, village workers may have difficulty learning and remembering every task (135, 152, 399). Since workers who are not literate cannot consult printed manuals, any lapses of memory are critical. Mistakes made by CBD workers as a result of poor training may damage their credibility or even harm the health of some individuals. To avoid overloading the training course, program managers should adjust course length and content based on the results of evaluations of trainees (see p. L-86).

Workers confronted with many demands on their time also may have trouble giving each service the attention it deserves. They may spend more time on measures that are in greater demand or easier to carry out. Conversely, they may concentrate on tasks that are more time-consuming (217, 397, 399). Curative services tend to be emphasized, and preventive services neglected. Also, workers cannot be asked to serve too many households. Experience in Iran and Haiti suggests that one full time paid worker can serve 100 to 200 families, while in China, the Philippines, and Thailand a part-time volunteer proved able to serve adequately only 10 to 30 neighboring households (30).

Phasing in New Measures Step-by-Step

Gradually phasing more health measures into a CBD program over a period of months or years can reduce the risk of overloading while satisfying community demands for a broad range of services. In a step-by-step approach, workers learn just a few health measures during their initial training. After they have proved their ability to deliver these services, and only then, they are taught additional skills. When they have mastered these skills, they are taught still more (31). This gradual expansion has been used successfully in the Family Planning Health Services Project in Bangladesh under the direction of Shushum Bhatia. Over a period of 18 months, CBD workers originally trained to offer family planning services were given additional training, first in maternal hygiene and nutrition, then in tetanus immunizations and iron/folate supplementation, and finally in oral rehydration therapy (55).

Introducing new services step-by-step also benefits the clients. When presented all at once with information about many health measures, clients may have difficulty learning everything (211). Multiple visits by the CBD worker, who presents a different health measure each time, may have more impact. In addition, introducing a new service during each home visit can keep clients interested. The Sudan Community Based Health and Family Planning Project, for example, found that phasing in first ORT, then oral contraceptives, and then nutrition education stimulated interest (405).

In summary, CBD programs that have been successful in delivering family planning or another service may gradually expand. They must, however:

- pay attention to the constraints imposed by limited resources,
- phase in new tasks, step by step.

PROGRAM EXPERIENCE

Implementing an integrated CBD program raises a wide variety of problems. Unfortunately, only anecdotes about program experience are yet available to identify CBD implementation problems. There are no controlled studies indicating how best to deal with them. Recognizing the need for operations research to study delivery systems in primary health care, the third International Congress of the World Federation of Public Health Associations recently called for "greatly increased support . . . for health services research that leads directly into a process of implementation." The Congress noted that such research "can provide direct means of resolving the growing problems in organization, management, and funding of health care" (107).

In the absence of such research, program managers can only be alert to aspects of the implementation process that others have found troublesome. They should monitor their own programs closely. They should be ready to make changes often in order to deal with problems as they arise.

In the experience of integrated CBD programs to date, six aspects of the implementation process stand out as special challenges:

- recruiting workers who can promote and provide health measures effectively,
- training workers in a variety of new skills,
- providing continued training and supervision of workers on the job,
- coordinating backup with the existing medical system,
- assuring that workers always have adequate supplies, and
- setting up an evaluation system to measure program performance and find weaknesses.

Recruiting Workers

The success or failure of a CBD program depends largely on the performance of village workers. Unfortunately, it is difficult to predict which persons, once trained, will do the best job as CBD workers.

Both female and male workers have successfully distributed health services, including family planning, in integrated programs (see Table 2, pp. L-99–105). The sex of the worker, however, affects which health services can be offered effectively and who will seek services from the worker. Depending on local culture, women may be more readily available to clients than men and better able to reach women and children. Men, in contrast, are often more mobile, better educated, and better able to organize group activities (17, 346, 403).

There is no single best age for CBD workers. Younger persons are more open to new ideas and more likely to be literate, and thus they may more easily learn the material presented in a CBD training course. They are also more likely than their elders to change their own health practices in favor of what they learn (64, 243, 346). Older workers, however, may be more respected in the community and better able to influence other villagers. Older workers are also less likely than younger workers to change jobs or move from the village and so disrupt the program (64, 243, 346).

Requiring that workers be literate or have a specified level of education makes training and record-keeping easier, an important consideration in integrated programs (135). It is not clear, however, that literate workers necessarily perform better on the job (391). Field supervisors in the Sudan Health and Family Planning Project noted that the younger, literate midwives gave better explanations to their clients (405). In several Latin American programs, however, whether or not workers were literate (152) or the amount of education they had made little difference to their performance (54, 97). Inflexible education or literacy standards have the disadvantage of limiting the candidates for CBD work (17). For example, such a requirement effectively excluded women as workers in a primary health care program in southern Sudan (129). Perhaps designing the training program and supervision to suit the workers' literacy or education level is more important than trying to enlist educated workers (17).

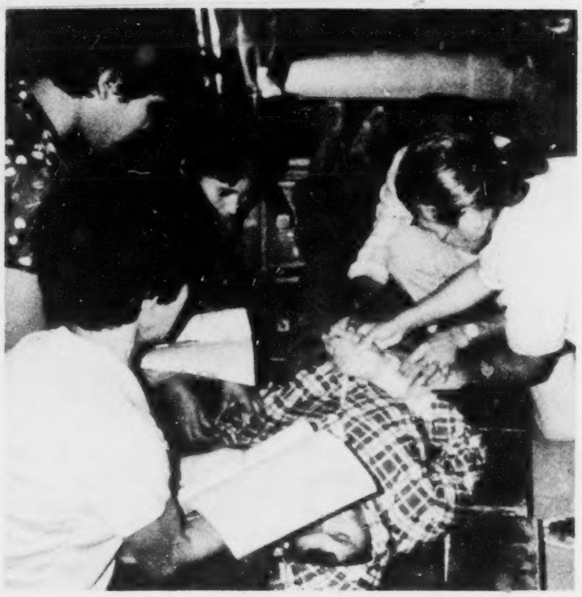
Many CBD programs try to choose workers on the basis of less quantifiable characteristics, including status within the community, reputation, interpersonal skills, desire to help others, and eagerness to participate (14, 202, 346). These qualities affect how much influence workers will have and how active they will be. In interviews with traditional midwives in southeast Asia, an anthropologist found that the best family planning distributors were self-motivated women who were natural community leaders (472).

In many programs the community is involved in the selection of workers (17, 265). Most programs select workers on an informal basis, relying on the advice of community leaders and the subjective impressions of the project staff making the choice (see Table 2). Sometimes, however, the choice has been left entirely to the village leaders, with only a few guidelines provided by project personnel (202, 346, 369). In other programs the villagers have nominated several candidates, from whom the program managers made the final choice (27, 57). The danger in community selection is that family or political considerations will outweigh considerations of candidates' competence (64, 311, 346). In addition, a person selected by one faction of the community may not be acceptable to the rest.

Training Workers

Workers in integrated CBD programs must be taught a wide variety of information and skills. They must know enough to make decisions about sometimes novel problems without out-

A health worker in Venezuela visits clients by boat. Poor transportation and communication systems often make it difficult to maintain the flow of supplies and to supervise CBD workers. (WHO/Almasy)



Health workers in the Philippines learn first aid by role-playing. Teaching methods that mimic work and encourage student participation are better than lectures. (Hesperian Foundation/B. Bower)

side help. They also need to learn how to deal with people in order to change health and family planning practices. Finally, they must be able to carry out all their tasks without neglecting any one of them. Since costs and trainees' other responsibilities force training to be brief, courses must be simple and sharply focused to accomplish all these objectives.

The best type of training for this purpose appears to be competency-based. In competency-based training the curriculum is tailored to the demands of a particular job (391). It covers all the knowledge and skills needed to perform the job satisfactorily without any extraneous or theoretical material (265). The curriculum is developed systematically from the workers' job description rather than based on an academic course intended for health professionals. All the tasks that the trainees will have to perform are analyzed and categorized as knowledge, skills, or attitudes (239, 265, 325). The task of mixing oral rehydration solution, for example, requires knowledge about the amount of each ingredient in the solution, skill in measurement, and the attitude that the measurement must be done carefully. It does not require an understanding of the physiological process of dehydration.

The success of training depends on how well course content matches the tasks. By these standards the Nicaragua *partéra* project initially had a poor training program: less than one-fifth of the time in the first courses was spent on material directly relevant to providing services (152, 153). By contrast, an El Salvador training program left out some very necessary tasks, such as how to fill out forms and keep records (227).

Teaching methods, like course content, must be carefully chosen to suit the needs of CBD training. Too often CBD programs rely on lectures, which are better suited to a literate audience with several years of formal education (391). The most effective teaching methods for CBD programs are those that encourage student participation, including small group discussions, question-and-answer periods, demonstrations, classroom practice sessions, role-playing, and field practice that mimics actual work situations (399, 403). Also, the use of familiar, vernacular language and local illustrations of concepts helps the trainees understand the material (227, 400, 403). In Bangladesh, for example, women learning about contraceptive choice could not understand the commonly used but foreign image of a "cafeteria approach." Instead trainers talked about choosing glass bangles from a vendor's stall (57).

It is difficult to find trainers for CBD programs who are familiar not only with competency-based training and participatory teaching methods but also with the practical problems of service delivery. Programs often rely on physicians and nurses to teach, but health professionals with little teaching experience tend to lecture and to present too much material too quickly (75, 127, 152). Also, they may not have a clear understanding of field work. Some programs have found that lower-level health personnel or senior CBD workers make good instructors, since they are familiar with the job and can talk on the same level as the students (106, 112, 403, 452). Regardless of the instructors' backgrounds, they will probably be more effective if they are especially trained to teach CBD workers and have specific manuals to follow (391, 399).

Length of Training

The length of training and the number of skills taught must be matched. If workers must learn many skills, training must be lengthy. If training must be kept short, the course must be limited to teaching a few skills. There is little information about the time needed to teach particular skills, but one estimate suggests two to four hours for simple skills such as measuring body temperature and two to four days for complicated skills such as preparing OR solution and teaching clients how to use it (112, 135). To be sure that training is adequate, trainees should be tested repeatedly during the course and then again at its conclusion. If the trainees are not learning the skills, the training course must be revised—fewer skills taught, more time spent, and/or new teaching methods introduced.

For trainees, whether literate or nonliterate, to learn material thoroughly, it must be repeated many times. This makes training a lengthy process. For example, literate students in the Zaire PRODEF 12-day training program had difficulty memorizing contraceptive side-effects and contraindications even with a daily half-hour drill (396).

Perhaps in response to this problem, there has been a recent trend towards longer training courses. Many current courses last two to three weeks or even longer (see Table 2, p. L-99–105). Courses cannot grow too long, however, because villagers are generally unable to leave their homes and their responsibilities for extended periods of time (391). Phased training, accompanying phased introduction of services, may be a better solution (49, 369, 405).

Oral examinations that test the students' ability to recall facts are not enough. Only observations of the students performing each task can test how they will perform on the job. Role-playing and similar simulations should be staged. Actual observation of performance in the field, although more difficult, is even better. In Haiti men scored better on the final test that evaluated basic knowledge in a CBD training program, but women ultimately performed better in the field (150). This suggests that the test did not measure the necessary performance skills. The results of an oral exam can be used to eliminate incompetent individuals from the program, however, as was done in the Bangladesh Matlab project, where 10 percent of the trainees failed (57).

In addition, examination results for a class of students can identify weaknesses in the training course that need to be corrected. For example, the test results in the PRODEF project mentioned above led to a revision of the course with more emphasis on simple contraceptive contraindications and side-effects (396).

Supervision and In-Service Training

CBD workers in the field need continuing supervision and support. This is often provided entirely by supervisors who make regular visits to the village. Supervisors may be local health service staff or project personnel. Group meetings at local health centers and village health committees may supplement direct on-site supervision. Supervisors can:

- facilitate access to outside resources, such as drugs and referral sources,
- help with difficult cases,
- teach new skills,
- monitor the workers' performance,
- legitimate the workers' role and increase their credibility, and
- maintain workers' morale (93, 265).

Without supervision, workers tend to become discouraged, lose sight of program goals, and gradually forget what they were taught (48). In the Calabar project in Nigeria, for example, when supervision was infrequent, the workers' skills deteriorated and their priorities changed. They neglected ORT and were unsystematic about weighing children (400). Supervision also can improve the quality of management decisions by providing a constant flow of information about field activities (157).

In many primary health care and CBD programs supervision is scanty or nonexistent (17, 20). Program managers too often focus only on training. Rather than hiring additional people to act as supervisors, they may delegate supervisory duties to health professionals or administrators already in their employ (157, 391). For these hastily recruited and ill-prepared personnel, responsibility for supervision of CBD workers may be an unwanted, low-priority addition to their regular duties. The difficulties of traveling to distant villages and the lack of adequate compensation for the trips may further discourage supervisors from performing field inspections (93, 346). There may also be too few supervisors to cover all the workers adequately.

A supervisor (left) watches a CBD worker in Zaire explain ORT during a home visit. Regular supervisory visits are important to monitor performance, help with difficult cases, and maintain morale. (Maria Wawer)

Doctors and nurses, CBD trainers, and senior CBD workers all have served as supervisors in various programs. Each has different strengths; no evidence suggests that one kind is best. Senior CBD workers have a practical knowledge of the job and can deal with the village workers as equals, but they lack medical expertise (93). Trainers have an established relationship with the village workers and a thorough knowledge of their abilities (318). Professionals possess medical expertise and can best enhance the workers' credibility in the village, but they may not understand conditions or attitudes in the rural areas (158, 370).

Group meetings for workers at a local health center, monitoring by a village committee, and radio communications can supplement infrequent supervisory visits (17). For example, the Matlab project in Bangladesh scheduled weekly sessions for village workers at subcenter clinics. The workers exchanged stories of experiences, consulted physicians and supervisors about field problems, learned about changes in policy, turned in records of their activities, and received additional training (57). Where villages are isolated, such a system could not function, however. In Afghanistan and the Philippines, local village committees were established to monitor and advise the workers (224, 346). Such committees cannot offer any technical assistance, however, and may make demands on the worker different from the supervisor's (163).

Medical Backup

Even though the health measures provided in CBD programs are safe and have few side-effects, there will still be a need for medical backup. CBD workers cannot handle serious medical emergencies or even the less serious problems for which they have not been trained. Therefore CBD programs should coordinate their efforts with existing health services that can provide medical backup.

Training courses for CBD workers should explain the local health system to workers and tell them the location of the nearest clinic. If possible, workers should visit this clinic and meet its staff before they start their duties. Special efforts must be made to foster communication and cooperation between village CBD workers and the health establishment so that referrals go smoothly (64). Direction from high-level administrative officials with authority over both CBD and clinic services will help greatly. CBD workers may have to escort patients to the clinic, helping them with transportation problems and ensuring that they are seen promptly (175, 314). In programs in Haiti and Indonesia, special referral forms have been developed for CBD workers. All or part of the forms are returned to the workers so that they know which of their patients went to the clinic and can follow them up (318, 359).

Supplies and Logistics

Obtaining and distributing drugs and other supplies is an essential but often poorly managed aspect of CBD programs. Inefficient purchasing can inflate supply costs or create shortages of supplies. Shortages not only prevent workers from treating some health problems but also discourage villagers from using program services. In order to keep their clients cared for and interested, some community health workers in Latin America have even resorted to buying drugs in commercial pharmacies when none were available from the program (39).

CBD and other health programs in developing countries have limited resources for buying supplies. In order to keep drug costs to a minimum, a program should order the cheapest safe and effective drug (35), choosing the generic rather than the brand-name product (62) and relying on locally manufactured or locally packaged supplies where possible (81, 203). Bulk purchases, at intervals depending on shelf life, are least expensive (39).

Shortages occur when managers cannot predict accurately when and how much to order. Systematic reports on warehouse inventory and the quantities of supplies distributed by the workers are essential for accurate predictions (39). The known incidence of each disease and seasonal variations, cost and difficulty of transportation, reliability of sources, storage space, and delivery time also must be considered (334, 426). In the Nicaraguan *partéra* program, lack of information about where supplies were and how quickly they were used up repeatedly caused shortages. The program director was forced to limit the amounts of the most popular drugs (mebendazole, vitamins, and aspirin) available to each worker (152, 157). In some cases, drugs may stay in storage for long periods because too much is ordered, there is no transportation available, or communication with the central warehouse is poor. Sometimes needed supplies may sit in central warehouses while CBD workers go without them.

Evaluation

Ongoing evaluation is particularly important as a management tool for integrated CBD projects: it indicates how well the program is functioning and whether change is needed. It also provides information to guide improvements (63, 91, 172). Because there has been relatively little experience with integrated CBD programs, continuous evaluation is even more necessary than in a traditional program.

Evaluation can focus on some or all of a wide variety of indicators. These fall into four categories, each category representing a different stage in the work of the program:

- **inputs**—the resources used by the program, such as the number of village workers,
- **processes**—the way in which each activity of the program is carried out—for example, how workers act during home visits or whether and why drug shortages occur,
- **outputs**—the services rendered by the program, including the volume of drugs used, the number of illnesses treated, and the percentage of the population covered, and
- **outcomes**—the effect on the community's health status and fertility as measured by changes in health indicators such as vital rates (63).

A fifth kind of evaluation balances inputs against outputs:

- **cost-effectiveness**—the money spent per unit of output or outcome—for example, the cost per year of life saved or the cost per couple-year of contraceptive protection (CYP) (315).

Process evaluation may be the most important type of evaluation for program managers because it uncovers problems early (286). By routinely monitoring process indicators, managers can identify and solve problems before they interfere with program effectiveness. The Colombian PRIMOPS evaluation looked at unexcused absenteeism, the number of households visited each day, and whether workers carried out all their tasks (98). Based on this type of information, managers could decide whether workers were doing their jobs properly, and, if not, just what facet of the work was causing trouble.

CBD managers must be prepared to act on the results of process evaluation and make changes in their programs frequently (230). For example, problems in using traditional midwives as fieldworkers and a lack of contraceptive choices made the first Matlab household distribution program in Bangladesh only moderately effective. The program shifted to better trained workers, more supervision, more choice of contraceptives, and additional services. As a result, the contraceptive prevalence rate increased (299). This example of constructive evaluation is exceptional, however. A survey of 180 low-cost health delivery systems found that, "while large numbers of projects report collecting a variety of data, relatively few are able to use this data to improve their operations" (20). More work is needed to help programs carry out process evaluation that is useful to them and make decisions based on the results.

Evaluations of program achievements—either outputs or outcomes—also can detect problems but cannot pinpoint their causes. Thus, output measures may show that workers are treating few cases of malaria, but they cannot determine whether it is because few people are suffering from malaria, the workers are not offering the service, there are shortages of chloroquine, or the clients are refusing treatment on account of rumors. Input evaluation is still weaker, since it shows only what resources a program is using, not how well it is performing.

Cost-effectiveness evaluation also is a useful, although more limited, management tool. It can determine the least expensive way to achieve an established goal. For example, it can weigh the costs and effectiveness of immunizing against diphtheria, whooping cough, and tetanus against the cost of treating the illnesses as they arise (36). It usually does not, however, consider the nonfinancial aspects of the decision such as human suffering during illness.

Information for evaluation can come from a wide variety of sources. Service statistics routinely gathered by workers provide perhaps the most information at the least cost. They also provide a continuous and cumulative record (138). Unfortunately, service statistics are often incomplete or biased. To prevent this, it is important to train workers thoroughly in keeping simple records and to inform them about how the data are used (240, 410). Even when accurate, service statistics may not provide information in a form that is useful for evaluation. For example, they may indicate that few persons are using a service, but not why. Service statistics can be complemented by surveys to find out about client attitudes, to make comparisons with service statistics, or to gather local vital statistics (138, 246, 410).

Less quantitative information may be easier to obtain and can be just as meaningful to program managers. Unsolicited complaints and suggestions from workers and clients are an obvious and important source of feedback (172). In a more systematic approach, a Guatemalan primary health care program has created behavioral criteria for evaluation, including:

- whether the community contributes voluntary labor or money toward health activities,
- whether workers attend training sessions regularly, stay after class to ask questions, and do optional reading, and
- whether neighboring villages ask for a health worker (26).

All CBD programs face problems in recruiting, training, and supervising workers and in handling medical backup, logistics, and evaluation. In addition, every primary health measure has unique features. The effectiveness, safety, and regimen of treatment, the prevalence and severity of the disease, and other specifics help to determine the suitability of health measures for CBD and influence the design of a CBD program. Further evaluation and operations research can help to identify and resolve some problems of community-based programs. The following sections discuss some of the primary health care measures offered through CBD programs or considered for CBD and their advantages, limitations, and programmatic requirements.

ORAL REHYDRATION THERAPY

Treating diarrheal dehydration with oral rehydration therapy (ORT) is a primary health service well-suited to CBD programs. ORT is inexpensive and effective. CBD workers can teach parents to prepare and administer the ORT solution correctly in the home, but workers need careful training since they must first learn a complex set of skills themselves and then teach these skills to mothers. Field practice and continuing supervision are essential. Also, home visits need to be repeated in order to motivate parents and refresh their knowledge of ORT. (See **Population Reports**, *Oral Rehydration Therapy (ORT) for Childhood Diarrhea*, L-2, November-December 1980).

Importance of the Problem

Children under age five may average two to five episodes of diarrhea a year (58, 59, 195, 226, 309). About one percent of all episodes of early childhood diarrhea lead to severe, life-threatening dehydration (59), and up to 10 percent of children die from diarrheal dehydration by age five (285).

Suitable Treatment

ORT consists of drinking a solution that replaces the fluid and essential salts lost in diarrheal stools. ORT does not cure diarrhea, nor is there clear evidence that it affects the duration of an attack. Started early in an episode of diarrhea, however, ORT can compensate for the first fluid losses. In more advanced cases, involving clinically apparent dehydration, clinical and field trials have proved ORT to be an effective means of rehydration even in many cases that would previously have required intravenous therapy (74, 162, 195, 254, 256).

There are three ways to prepare oral rehydration (OR) solutions:

- **Complete-formula packets**—Prepared packets such as Oralyte, provided by UNICEF, contain four dry ingredients, according to the WHO formula:
  3.5 grams of sodium chloride (table salt),
  2.5 grams of bicarbonate,
  1.5 grams of potassium chloride, and
  20.0 grams of glucose.
  Workers or parents mix the contents of the packet with one liter of water.
- **Spoons**—Table salt and sugar (sucrose) are measured with household spoons or special ORT spoons and then mixed with a specified quantity of water. This makes up an "incomplete" OR solution, which does not contain potassium or bicarbonate. When sucrose is substituted for glucose, the quantity of the sugar must be doubled. Thus 40 grams of sucrose would be used in a liter of water.
- **Pinch-and-scoop**—Table salt and sugar are measured roughly with the hand and mixed with a specified amount of water (72, 257, 276).

Each of these approaches has advantages and disadvantages for CBD programs. Packets are the most effective in moderate to severe diarrhea because they contain all the salts and glucose rather than sucrose. Also, they are the easiest to use in the home since only the water needs to be measured. Packets generally are the most expensive approach, however, and maintenance of a supply may be difficult. In recent years the cost per packet has ranged from $.06 to $.20 (US) for most programs (236, 378, 422). The UNICEF price recently has been about $.07 (US) (379). Local production—for example, paying people to measure the dry ingredients into plastic bags—may minimize costs (83, 218). Packets may be distributed free of charge or sold, but in any case a reliable d[illegible]bution system is necessary (426).

Some have expressed concern that the sodium concentration of 90 milliequivalents per liter in the prepackaged WHO formula is too high, especially for infants (92, 118, 338). Major clinical symptoms of high serum sodium levels (hypernatremia) have not been observed with properly prepared Oralyte, however (78, 86, 255). Giving infants plain water or breastmilk in addition to the OR solution reduces any potential risk (73, 285, 288, 419).

Using spoons or the pinch-and-scoop method eliminates the need for special packaging and transport, but these methods depend on the availability of commercial supplies of sugar and salt or of local substitutes such as date palm sugar. In some areas, such as Nepal, Sudan, and Zaire, families may not always have salt or sugar (87, 292, 396) or may find the ingredients too costly for frequent use.

Questions have been raised about the effectiveness and safety of incomplete formulas, but evidence to date shows these formulas to be satisfactory, especially for early use. Neither clinical symptoms of potassium deficiency—because the formula lacks potassium—or of acidosis—because the formula lacks bicarbonate—has proved to be a substantial problem in field studies (88, 176, 247). Further study is desirable, however. Solutions made with sucrose may lead to slower rehydration and larger stool volumes than ones containing glucose, but sucrose solution has been proven to be effective (242, 269).

It has been suggested that, if none of the ingredients for OR solution are at hand, locally available fluids, such as rice water, fruit juice, broth, or plain water, could be substituted for OR solution during early treatment (123, 412, 428). This has been little studied, however.

Mixing and Administering OR Solutions

The major concern in the community-based distribution of ORT is assuring that parents mix the OR solution accurately

A CBD worker in the Zaire PRODEF program shows mothers how to measure water for ORT in a common local beer bottle. Careful instruction is needed to teach correct ORT preparation. (Maria Wawer) and administer it correctly during each attack of diarrhea. Solutions made with too much water may be ineffective, particularly in moderate to severe diarrhea. Solutions made with too much salt can cause hypernatremia. While packets are easier to mix than homemade solutions, which require measurement of sugar and salt as well as water, tests of all three methods have found wide variations in concentrations among solutions mixed by different people (4, 81, 148, 165, 213, 241).

Not only accurate mixing but also correct administration of OR solution is essential to ensure that the child receives enough. The amount given varies with the size of the child and the severity of the diarrhea (57, 59, 276, 285), but the average amount for a child one year or older with mild to moderate diarrhea is about 1.5 liters per 24 hours. The child can be slowly given between 200 and 250 ml of the solution after each diarrheal stool, day and night—a convenient way to tailor the quantity given to the severity of the diarrhea. Extra water should be given between administrations of OR solution. Also, feeding, particularly breast-feeding, should continue (244, 421, 425).

Training and Supervision

Four aspects of CBD program design require special attention:

- training workers to give correct, easily followed, easily remembered instructions,
- educating parents about ORT and diarrheal disease,
- planning repeated visits to refresh parents' memories and to motivate them,
- supervising CBD workers closely.

CBD workers need careful training and time to practice their new skills before they begin to deliver ORT in the field. A prerequisite is that workers first learn to mix the OR solution accurately themselves. They must also be able to teach parents when to give it and how much to give. Workers also should know and be able to explain when a child should be taken to a clinic. Training must not be limited to a fixed term, but must continue until the workers demonstrate their competence. Both CBD workers and parents should have a refresher course just before each diarrhea season.

Training workers until they learn ORT usually takes several days at least. The Sudan Community Based Health and Family Planning Project conducts a week-long ORT training program for midwives, many of whom are nonliterate or semiliterate. Training includes actual field practice in preparing OR solution from packets and administering it to dehydrated infants. Two to three months after training, field supervisors found that these midwives still prepared the solution accurately and instructed clients correctly (206, 405). In the Zaire PRODEF project, literate workers, including nurses and schoolteachers, spent two days of a 12-day course exclusively on ORT (396). Just how much training is needed depends on the abilities of the workers and their teachers and on the type of ORT. Each program must learn from experience how long it takes to train workers adequately.

The value of careful and thorough instruction of parents is clear. For example, in Nepal 25 percent of 56 women who watched a demonstration of the pinch-and-scoop method mixed solutions with too much salt. In a second group of 50 women, who had more extensive instruction and closer supervision, no one mixed a solution that was too salty (292). Because parents must learn between 10 and 15 separate points of information (113, 395), it may be best for an integrated CBD program to devote one home visit to ORT alone. Other services can be offered during follow-up home visits.

CBD workers' repeated visits reinforce initial instructions to parents. The Egyptian Strengthening Rural Health Delivery (SRHD) Project found that performance improved the more often that health workers visited mothers. After three home visits, 85 percent of the women measured a liter of water accurately and 74 percent chose the correct size of spoon for measuring. After nine home visits, the percentages rose to 97 and 96 percent, respectively (241). The Concerned Women's Project in Dacca, Bangladesh, also has found repeated personal instruction necessary to teach ORT (100).

Supervision is necessary to ensure that CBD workers are correctly and successfully teaching women how to use ORT. The supervisor can question workers and observe them on the job. Indirect supervision—that is, visiting mothers who have been trained in ORT and watching them prepare the solution—is also valuable (113).

CBD programs must educate parents and often the medical profession to overcome misconceptions about diarrhea. First, in some areas people underestimate the danger of diarrhea because it is so common (160). Second, because ORT does not cure diarrhea, parents may lose faith in it unless they are told what to expect (356). Finally, ORT must compete with well-established medical or folk remedies. Doctors and other medical practitioners sometimes inappropriately prescribe antibiotics or other drugs for diarrhea (228, 357, 366). Also, in many societies mothers traditionally withhold food from children with diarrhea (174, 366). In the Philippines and Egypt, the message of ORT programs that feeding should continue was much less well accepted than giving OR solution, perhaps because it directly contradicted traditional practices (174, 262).

ORT programs must be designed with care to seek the support of the entire community. When rumors, physicians' resistance, and other problems hindered the initial efforts of Saad Gadhalla's Menoufia project in Egypt (228), the program was redesigned. Village leaders and medical personnel were informed about the program, and their support was secured. Open village meetings then prepared the rest of the community for the CBD workers' household visits (21).

For ORT programs, as for many primary care services, medical backup is desirable. This is not because of any dangers of ORT, but to provide intravenous rehydration for the most severe cases. Also, some serious illnesses that cause diarrhea, such as shigella dysentery, may require antibiotics to cure the infection. ORT programs are justified, however, even where no medical backup is possible. Some children may die in spite of ORT in these areas, but many lives can still be saved.

CBD Program Results

Although operating community-based ORT programs is demanding, the limited evidence available suggests that these programs can help to lower childhood mortality. In the Egyptian SRHD Project and in a Bangladesh study, rates of childhood mortality attributed to diarrheal disease appeared to be lower in areas served, in Egypt, by either household distribution of packets or teaching of ORT using household sugar and salt or, in Bangladesh, by village depots than in control areas (241, 297) (see Table 3). SRHD results for the population as a whole are reinforced by the observation that diagnoses of causes of death did not appear to shift during the study (241). On the other hand, SRHD data have not yet been analyzed to determine which individuals within the population used ORT. In the Bangladesh study the number of deaths analyzed was small.

BEST AVAILABLE COPY

Table 3. Deaths per 1,000 Children Age One Month to Five Years, by Treatment Group, Before (1976-1979) and During (1980) the Egyptian Strengthening Rural Health Delivery Project

	1976-79	1980
Oralyte—home distribution	18.9	11.2
Oralyte—commercial sources	19.9	16.9
Household sugar and salt—home preparation	17.7	10.3
Prepackaged sugar and salt—home distribution	23.4	9.3
Control area 1	19.4	17.3
Control area 2	21.5	18.8

Source: Mobarak, A.B., Hammamy, M.T., Gomaa, A.I., Abou-El-Saad, S., Lotfi, R.K., and Mazen, I. Diarrheal disease control study May through October 1980. [Cairo], Egypt, Ministry of Health, Rural Health Dept. Strengthening Rural Health Delivery Project, [1980].

By contrast, in one part of the Menoufia project, involving 12 Egyptian villages, child mortality rates appeared to be no lower in villages where Oralyte packets were distributed to households and available from depots than in control villages. While the collection of data in different areas at different times may have led to some underestimation of program impact, and data indicating whether ORT was used in nonfatal diarrhea cases are lacking, it is known that ORT was not used sufficiently or properly among children who died in either set of villages. Only about one-third of the fatal cases in the CBD villages received any OR solution, and many of those who did received too little too late, even when taken to health care personnel who had been informed about oral rehydration (366). These observations emphasize the importance of thorough and repeated training for mothers and full cooperation and education of local pharmacists and doctors.

ORT is an imporant intervention to include in a CBD project, both because diarrhea is widespread and serious and because ORT is effective, inexpensive, and technically simple. Plans for its implementation, however, must recognize that ORT is both labor- and time-intensive, since the workers and parents require careful and repeated training and ongoing field supervision.

TREATMENT OF MALARIA

The most feasible malaria program for CBD is treatment of individual acute cases using chloroquine. Chloroquine is relatively inexpensive, nontoxic, easy to administer, and, in areas where malaria-causing organisms have not developed resistance, effective. The major requirement is that villagers must have access to the necessary supplies whenever they become sick.

Importance of the Problem

The need for malaria treatment is immense. An estimated 100 to 125 million people are infected with malaria annually. At least one million die, mostly in Africa (290, 339). Where malaria is endemic, as in tropical Africa, it is a major cause of death among children (19) (see Table 1).

Of the four types of malaria, the type caused by *Plasmodium falciparum* is the most serious. It causes just one-fifth of all malaria cases but two-thirds of the deaths (46). Case-fatality rates among untreated children and nonimmune adults are more than 10 percent (46). In Africa almost all malaria cases are caused by *P. falciparum*. Malaria caused by *P. vivax*, *P. ovale*, or *P. malariae* is rarely fatal but is difficult to cure completely, causing relapses over a period of years and, particularly in the case of vivax, extreme debilitation (283). In endemic areas young children and pregnant women are most at risk from malaria because their natural immunity to the disease is weakest (19, 189).

Control, Prophylaxis, or Treatment?

CBD programs lack the resources to mount a full-scale eradication campaign, which includes spraying the insides of all dwellings to kill mosquito species that transmit malaria. Public health workers vigorously advocated eradication campaigns in the 1950s and 1960s but now recognize the difficulties of that approach. WHO is currently emphasizing malaria control, of which the distribution of antimalarial drugs is an important component (424). Drug distribution is feasible for a CBD program.

CBD programs can provide antimalarial drugs in either of two ways:

- on a prophylactic basis to vulnerable groups, such as all children and pregnant women, or
- on a treatment basis for acute cases.

Prophylaxis provides undisputed short-term health benefits: it substantially reduces morbidity and increases hemoglobin levels lowered by prolonged or repeated malaria (111, 189). It also permits simple logistics. Workers follow a regular schedule, administering a single dose of chloroquine to children and pregnant women every week or, if they have acquired semi-immunity through previous exposure to malaria, every month (111).

Over the long run, however, repeated preventive doses may create two important problems. First, they may reduce natural semi-immunity, which depends on repeated exposure to malaria and the continued presence of small numbers of the parasites in the blood cells (189). Second, widespread use of a drug, especially in blanket prophylaxis, exerts a selection pressure for drug-resistant strains (267, 404). This is especially likely if the preventive program does not reach every person in every round (310) or if individuals take insufficient doses.

To minimize the problem of reducing immunity, prophylaxis can be limited to children under age five. After that age, children may be better able to withstand an acute malaria attack, and they can begin to build up semi-immunity. An alternative is to offer prophylaxis to larger groups but using lower doses so that they do not interfere with semi-immunity. Both strategies—especially the latter—might hasten the development of drug-resistant malaria strains, however (437). Furthermore, prophylactic strategies are costly.

Treatment only of individuals with symptoms may be a better choice for CBD programs. In addition to minimizing both interference with semi-immunity and the development of resistant strains, it requires less medication. Also, it may be more popular with the community because it produces clear results. In CBD programs treatment usually requires that the CBD worker be available at all times to dispense drugs when needed. While it has recently been suggested that chloroquine tablets be left in every home for use when fever occurs (455), this approach has not yet been adopted.

The most practical and effective approach for CBD programs is generally to treat acute cases on a presumptive basis, but using a drug dose high enough to cure falciparum malaria (437). Presumptive treatment means that all fevers are assumed to be due

CBD workers can treat malaria easily and safely by giving chloroquine tablets in all cases of fever. Unless serious resistance to the drug exists, a single dose can save lives in all types of malaria. (USAID)

to malaria, and blood smear examinations to confirm the diagnosis or determine the type of malaria are omitted. This is often the only practical option for CBD programs because blood smear exams are costly and require special technicians and equipment. In cases of falciparum malaria, presumptive treatment with a single, large dose of chloroquine brings about a radical cure—that is, it kills all the malaria parasites present. In cases due to *P. vivax, P. ovale,* and *P. malariae*, a single chloroquine dose will relieve symptoms and reduce mortality, but it will not provide a radical cure. To prevent relapses, primaquine must be used to eradicate the persistent liver stages of these parasites. Primaquine, however, can cause serious side-effects in blacks and members of some Mediterranean ethnic groups (192), and so it is not as well suited to CBD as chloroquine. Even where the persistent types of malaria are common, presumptive treatment with chloroquine is justified in high-incidence areas, since later attacks will be more often due to reinfection than to relapse. If the fever is not due to malaria at all, its persistence after chloroquine treatment indicates the need for further diagnosis and care (437).

Choosing the Drug

Chloroquine is the drug of choice for malaria treatment where resistant strains are uncommon. It works quickly and effectively with few side-effects (283). Nausea, vomiting, blurring of vision, and headaches may occur, but they are mild and transient (438). Cases of retinal damage have been reported, but only in persons exposed to large, cumulative doses over many years (124, 237). In sub-Saharan Africa, itching has been reported to be a side-effect (267). Other side-effects are rare and self-limiting (336, 376).

Chloroquine is suited to CBD for programmatic reasons as well as medical reasons. It is inexpensive: a recent suggested price for programs buying from UNICEF was about $.01 (US) per 150 mg tablet (379). Chloroquine has a long shelf-life. It can be administered to semi-immune individuals as a convenient single dose (89, 108, 141, 201). A 2- or 3-day regimen has been recommended for infants and children, who may not have developed semi-immunity (197, 371). An expert group advising USAID, however, has concluded that single-dose treatment should be mandatory for all cases of fever, at least in Africa (437). CBD workers must learn to determine the correct dose, either by age or weight, for each individual. Workers can be given simplified dosage charts or, if nonliterate, use a system of prepackaged or color-coded doses. Each program needs to determine the appropriate doses for its area, since resistance to chloroquine builds up slowly.

Where chloroquine-resistant strains of falciparum malaria are common, other drugs must be used. Resistance to chloroquine is widespread in South America and Southeast Asia (216, 404) and recently has been reported in parts of Africa (28, 121, 219). Several drugs effective against chloroquine-resistant malaria can be administered in single doses and thus are most suitable for CBD programs. The first is a combination of sulphadoxine and pyrimethamine (Fansidar), widely used in Southeast Asia (101, 223). Taken as a single dose, the drug causes minimal side-effects but is relatively slow-acting. Also, relapses occur, often in 10 percent or more of cases (100, 321). The second drug, mefloquine, has been developed by the US Army and is not yet commercially available. Neither drug appears to be as effective as chloroquine against *P. vivax* or *P. malariae* (101). Therefore they should not be used on a presumptive basis where these types of malaria predominate. The expert group advising USAID recommended amodiaquine for use in Africa when serious resistance to chloroquine arises (437). Amodiaquine is similar to chloroquine in its mode of action, dosage requirements, and side-effects, but it is effective against some strains of chloroquine-resistant malarial parasites (466). Resistance to Fansidar has developed in southeast Asia and can be expected to develop to any antimalarial drug wherever it is heavily used.

Program Implications

Malaria treatment in CBD programs is relatively simple in areas where chloroquine is effective. Training can be brief. If workers are to treat acute cases, they should be able to recognize fever and to determine whether the cause is likely to be malaria or another illness, possibly together with malaria. Even if malaria is not the cause of fever, however, CBD workers can give chloroquine, since other infections or physical stress can precipitate an acute malarial attack (429). The worker should be able to deal with other causes of fever and with complications of malaria, either by treatment or referral. Thus backup care is desirable.

Communities where malaria is common are likely to support a treatment program. Parents usually recognize the danger for young children (45, 221), and the drugs produce rapid symptomatic relief of fever and malaise. Moreover, treatment does not require substantial training for parents.

TREATMENT OF INTESTINAL PARASITES

Treatment of intestinal parasites, such as roundworms, has been combined with family planning in some CBD programs. Such treatment is relatively easy and is usually popular at first, when it produces visible results. The long-term health benefits may be slight, however. Although worms are common, they do not cause substantial morbidity unless they are present in large numbers. Moreover, reinfection is rapid, and therefore repeated antiparasite treatment is necessary. The decision whether to undertake this health measure may hinge upon a comparison of the costs of antiparasite programs and of other programs that may have more substantial health benefits.

Importance of the Problem

Intestinal parasites are a very common problem in developing countries. Among the most important parasites are the helminths, in particular roundworms (*Ascaris lumbricoides*), hookworms (*Ancylostoma duodenale* and *Necator americanus*), and whipworms (*Trichuris trichuris*). Prevalence peaks at ages 2 to 14 for roundworm, ages 16 to 30 for hookworm, and ages 5 to 10 for whipworm (479). In some communities 90 percent of the population is infected with roundworms, and in others 100 percent have whipworms (168). The prevalence of hookworms has ranged as high as 70 percent in parts of South America (414). Often individuals are infected with several types of parasitic worms (414).

Although very prevalent, worms cause relatively little sickness. Symptoms depend on the number of worms in the body (the worm burden, or load), and this varies dramatically even within a single community (392). In many cases, less than 15 percent of the human population harbors more than 65 percent of the worm population (25). For the majority, whose worm burden is light, symptoms are few or nonexistent. Infrequently, **roundworms** in large numbers can cause blockage of the intestines, requiring surgery (61). The effect of roundworms on nutritional status is less certain. In studies in Bangladesh, Colombia, India, Kenya, and Tanzania, improvements in nutrition indices or intestinal absorption have been reported after deworming (66, 143, 352, 372, 373, 408), but many of the studies have been criticized on methodological grounds (190). In addition, results have not been consistent (125, 331). Treatment of worms may have little impact unless nutrition improves.

Heavy **hookworm** infections, on the other hand, can contribute to anemia. Adult hookworms suck blood from the intestinal walls, producing an anticoagulant that slows down clotting where they break through the mucosa (304). Much of the iron lost in the bleeding is reabsorbed (116), but heavy hookworm loads can cause iron-deficiency anemia (225, 304, 316), especially if diets lack sufficient iron (190). Iron supplements can restore normal hemoglobin levels even when the hookworms themselves go untreated (293, 303). In fact, iron supplementation actually resolves the anemia faster than worm treatment (304).

The effects of light to moderate **whipworm** loads are usually minimal, but whipworms in very large numbers can cause diarrhea, dysentery, rectal prolapse, and anemia (43, 414). Children in precarious iron balance are especially at risk; they develop anemia when the load exceeds 800 worms. (Up to 5,000 worms have been recovered from heavily infected children (207), but such heavy infections are rare.)

Possibilities for Treatment

Eradicating parasitic worms is extremely difficult and beyond the capacity of CBD programs. Breaking the transmission cycle of the worms requires changes in sanitation, personal hygiene, and other complex behavior (43, 392). For CBD programs the only realistic choices are limited control programs that rely primarily on antiparasite medications to treat (1) the entire population, (2) specific target groups, or (3) symptomatic individuals. In the first two cases treatment should be repeated at 3- to 4-month intervals.

By treating everyone in the community, a CBD program can theoretically limit the prevalence of the parasites and reduce the morbidity associated with them. Periodic treatment will cure many individuals and reduce the worm burden to asymptomatic levels in others (392, 414). In the long run, this may lower the total number of eggs produced by the worms and thus reduce the contamination of the soil (79, 177, 180). Treatment must continue indefinitely, since reinfection is common. In a South Korean village, even a schedule of treatments every other month did not eradicate roundworms. Reinfection occurred steadily from sources outside the village (327). Mass treatment is thus time-consuming and unlikely to eradicate the worms.

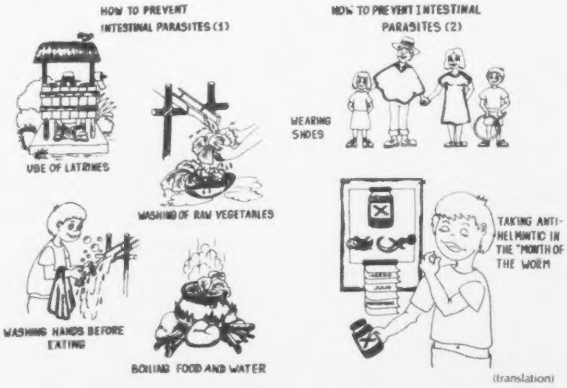
Most CBD programs have limited the treatment to selected groups, such as school-age children. This saves time and money. Given the varied age ranges of peak prevalence, however, choice of a target group is difficult. What is more, mass treatment of specific groups produces minimal benefits since morbidity is slight in most individuals. Ideally, if such a program is planned, stool samples should be examined to establish the prevalence of each type of intestinal parasite. Periodic sampling can show how the program is affecting prevalence.

Treating only individuals with heavy worm loads minimizes costs, but raises the problem of diagnosis. Many symptoms of heavy worm loads, such as abdominal pain, bloating, loss of appetite, and anemia, can be due to other causes. Even the passing of visible worms does not necessarily indicate the size of the worm load. Definite diagnosis of heavy loads requires a stool examination. Collecting the stool samples takes time and labor, while the examination itself requires facilities and technicians that are not always available (180). Thus diagnosis and selective treatment may not make the best use of CBD resources. An alternative that reduces drug costs and avoids stool examinations is to treat only individuals who complain about worms in their stools.

Choosing the Drugs

Several medications for intestinal worms are suitable for community-based distribution. Most of them cure cases of infection more effectively when taken in multiple doses, but single-dose regimens will cure some individuals and reduce the worm burden in the rest (190). They have few side-effects.

The difficulty is in choosing among the drugs. Information about the distribution of the worms can guide the decision. Piperazine is the drug of choice when roundworm is the major problem. It is safe and inexpensive as well as effective. It creates a dramatic effect, since even a single dose will cause most recipients to expel some roundworms within a short time. A single dose of pyrantel/oxantel can be used for hookworm infections. So can a single dose of bephenium, but it tastes bitter and can cause nausea and vomiting.


HOW TO PREVENT INTESTINAL PARASITES (1)
USE OF LATRINES
WASHING OF RAW VEGETABLES
WASHING HANDS BEFORE EATING
BOILING FOOD AND WATER
HOW TO PREVENT INTESTINAL PARASITES (2)
WEARING SHOES
TAKING ANTI-HELMINTIC IN THE "MONTH OF THE WORM

(translation)

In terms all can understand, a booklet by PROFAMILIA of Colombia describes the life cycles of intestinal worms and explains how to avoid worms. Created for an integrated family planning and worms project, the booklet carries a family planning message on the last page.

SOCIAL MARKETING AND HEALTH

Social marketing, like community-based distribution, is a delivery system that has been tested by family planning programs. Potentially social marketing can be expanded to include health products. Social marketing programs sell contraceptives through existing commercial outlets at a low, subsidized price intended to encourage wider use (see **Population Reports**, *Social Marketing: Does It Work?*, J-21, May 1980, and *Update on Condoms—Products, Protection, Promotion*, H-6, September 1982.) Social marketing can increase the use of a contraceptive or health product because:

- The low price makes products affordable to low-income families.
- The program brings the goods to local stores and other convenient outlets where people do their regular shopping (51).
- Advertising in the mass media, an important element of social marketing, makes people aware that the product exists and is readily available.
- Advertising may encourage use of the new product by altering traditional beliefs and practices (160, 222).

Current Programs

In several countries the addition of health products to family planning social marketing projects is under consideration. ORT packets, medicines for intestinal worms, and nutritional supplements have been suggested (65, 85, 289, 319). Few such combined programs are underway, however. Combined social marketing of contraceptives and health products in Colombia, Thailand, and Bangladesh are exceptions.

The Colombia PROFAMILIA program recently began to sell, through pharmacies, such products as analgesic tablets, antibiotics, sanitary napkins, and disposable diapers in addition to contraceptives (470). Analgesic tablets and pyrantel pamoate to combat intestinal worms also are being marketed on a trial basis through retail outlets ranging from neighborhood food stores to large general stores (136, 289).

In Thailand, village distributors of the Family Planning Health and Hygiene project conducted by Community-Based Family Planning Services (CBFPS) sell 15 household drugs, including oral rehydration salts, multivitamin tablets, and medicine for worms, along with oral contraceptives, condoms, and spermicides (80).

ORT packets have been test-marketed in Bangladesh by the social marketing program, which sells *Raja* condoms and *Maya* oral contraceptives. A small-scale trial in a few remote towns found that demand for ORT was substantial. In three months 9,500 packets were sold through a few pharmacies at a price of six taka—about $.42 (US)—even though there was no promotion. A larger trial is planned (85, 164, 320).

Safe delivery kits, intended to reduce the incidence of neonatal tetanus, have also been test-marketed in the Bangladesh social marketing program. They consist of a razor blade, soap, disinfectant, antiseptic, thread, bandages, and a plastic sheet, and are sold for 24 taka—about $1.70 (US). Over 2,000 kits were sold per month in mid-1982 (115).

In an effort similar to social marketing, the Bohol project of the Philippines has helped villages to establish cooperative drug stores (*boticas sa barangay*) that provide basic nonprescription medicines at low cost. Instead of subsidizing the cost of the drugs, the project arranges for bulk purchases at wholesale prices and passes on savings to customers (62, 271).

Requirements for Social Marketing

There are special limitations on distributing health products through social marketing systems. Customers must be able to diagnose their own medical problems and request the appropriate treatment. Thus social marketing is especially appropriate in three cases:

- for illnesses such as diarrhea and headaches, in which the condition is obvious to the layman;
- for illnesses in which individual diagnosis may be unnecessary because the conditions are widespread, such as worm infestations or malnutrition;
- for distribution of commodities, such as soap, that have preventive functions and do not depend on any specific diagnosis.

Customers must also be able to administer the treatment safely and appropriately with only limited instructions. Some health products, such as nutritional supplements, aspirin, and soap, are suitable because they have few safety hazards. Others, such as some medications for intestinal worms, can be simplified to a single dose and the customer can be sold just one pill.

ORT, by contrast, requires detailed instructions. Package inserts of the traditional kind are of limited value to the nonliterate. For example, Egyptian women purchasing commercially produced OR salts (*Rehydran*) in pharmacies routinely mixed them with too little water, despite printed instructions in both English and Arabic (86). Pictorial package inserts, such as those developed by the Program for the Introduction and Adaptation of Contraceptive Technology (PIACT), are a potential solution, especially if they are coupled with oral instructions from the vendor (294). Women in Honduras remembered how to mix and use ORT after one lesson from a supplier when that lesson was tied to a series of pictures in the package insert (11, 12) (see photo, p. L-95).

The cooperation and training of vendors is critical (65). The Strengthening Rural Health Delivery Project in Egypt traced problems in its ORT social marketing program to poor training of pharmacists and shopkeepers. A spot check of vendors revealed that they did not recommend OR salts to their customers and gave many of them incorrect instructions about how to mix and administer the OR solution (241). Even with adequate training, however, many vendors do not have time for extensive education of their customers.

In some countries drug sales are restricted to pharmacies; only advertising directed to doctors and pharmacists may be allowed; and purchases may require a doctor's prescription. These restrictions effectively limit distribution to urban areas, since there are few rural pharmacies (68). They also discourage home management of common medical problems. Many social marketing programs have succeeded in distributing oral contraceptives despite some or all of these constraints, however (15). Carefully designed and implemented social marketing programs could do the same for some health products.

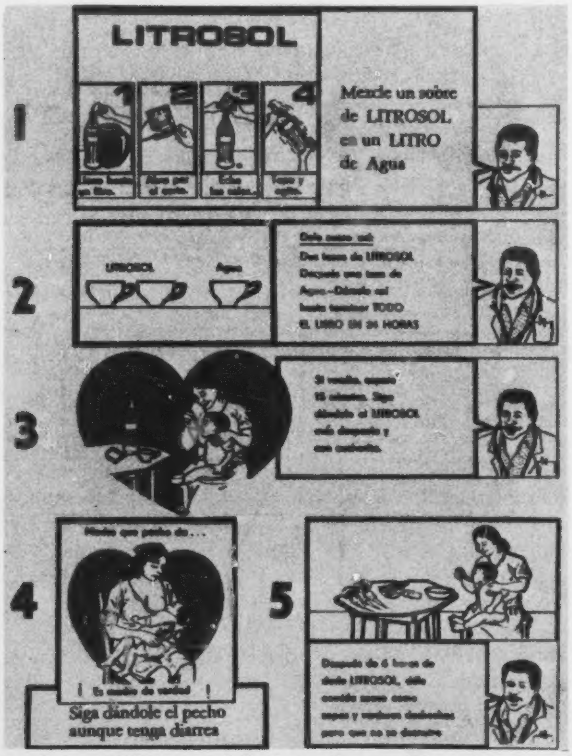
In addition to acting against roundworm and hookworm, mebendazole is more effective than other drugs against whipworm, which, among the parasites in question, has the least impact on health. Mebendazole has not been tested in children under age two (251, 459) and is not recommended for pregnant women (324). An advantage of mebendazole is that one amount is appropriate for everyone, while doses of some other drugs vary depending on body weight. A number of trials with single doses have reported high cure or egg reduction rates for all three worms (185, 252, 279, 282, 328). Most of these studies have methodological problems, however.

The relative cost of medications also is important, since an ongoing program will use large quantities. Purchased in bulk from UNICEF, 1,000 tablets of piperazine (500 mg) recently have cost $3.68 (US); 1,000 tablets of mebendazole (100 mg), $26.10 (379). Thus a single 1,000 mg treatment with piperazine, appropriate for an average child of age three, costs less than one cent; a 2-tablet dose of mebendazole, about $.05, a fivefold difference. (Treatment of older children requires higher doses of piperazine but the same dose of mebendazole, reducing the price difference.)

Program Implications

CBD workers need relatively little training and supervision to be able to treat intestinal parasites, either in a target group or in individuals complaining of worms. The drugs themselves require little or no follow-up since side-effects are few and mild. Referrals are rarely necessary. The worm burden is temporarily reduced (306).

The major drawback of such a program is that deworming must be repeated at frequent, regular intervals since reinfection is rapid, often occurring within four months (25, 70, 253). A South Korean study concluded that treatment on a 9- or 12-month schedule had no impact on roundworm prevalence, whereas treatment on a 4-month schedule reduced the percentage of those treated who had any parasite eggs in their stools from 32 to 2 percent in one year (327).


LITROSOL
1
1
2
3
4
Mezcle un sobre de LITROSOL en un LITRO de Agua
2
LITROSOL
Agua
3
4
¡ Es medio de verdad !
Siga dándole el pecho aunque tenga diarrea
5

Honduran distributors read the instructions on this package of oral rehydration salts to nonliterate women, who then use the pictures as reminders of how to mix and use OR solution. (William A. Smith)

In many CBD programs in Asia and Latin America, deworming has received an enthusiastic reception at first, when the worms expelled are large, numerous, and obvious (199, 281). Communities may lose interest, however, as time passes and successive treatments yield fewer or no visible worms (8, 137, 329, 386). Programs sponsored by the Japanese Organization for International Cooperation in Family Planning (JOICFP) have responded to this problem by increasing motivational efforts and adding other health measures (8, 329, 386).

NUTRITION MEASURES

CBD programs have addressed or considered two types of nutritional problems, both of which are widespread:

- protein and calorie malnutrition and
- specific vitamin and mineral deficiencies, especially deficiencies of vitamin A, iron and folate, and iodine.

There is no doubt that better protein and calorie nutrition can help to reduce morbidity and mortality greatly. It is not certain, however, how effective CBD distribution of protein and calorie supplements is in improving nutrition. In addition, the distribution of such food supplements is expensive, logistically complex, and time- and labor-intensive. Distributing certain specific vitamin and mineral supplements may have a clearer impact on health and at the same time require fewer human and financial resources.

Nutrition education may be relatively easy for CBD programs, but its impact is unclear and certainly is limited to areas where families have enough food to give more to their children. Periodically weighing children, a common educational and diagnostic device, can make mothers aware of nutritional problems.

Importance of the Problem

Protein and calorie malnutrition is a pervasive problem in developing countries (33, 191), affecting as many as half the children under age five in some areas (362). Protein and calorie deficiencies cause or contribute to a wide spectrum of health problems, especially in children (105, 181, 191, 212, 261, 411, 415). Malnutrition interacts with infections, especially measles and diarrhea, increasing morbidity and mortality (261, 362). Furthermore, poor maternal nutrition before and during pregnancy is associated with low birth weight, and therefore indirectly with increased perinatal and infant morbidity and mortality (322, 323, 330, 362).

Individual vitamin or mineral deficiencies are not as widespread as protein and calorie malnutrition, but nonetheless they are major public health problems in some parts of the world. Lack of vitamin A, for example, can cause blindness (343, 420), iron and folate deficiencies can lead to anemia (161, 330), and iodine deficiency is related to endemic cretinism and goiter (350).

Protein and Calorie Malnutrition

CBD programs have tried two approaches to correcting protein-calorie malnutrition:

- **nutrition education**—Workers make mothers aware of the nutritional status and needs of their children and teach them improved feeding practices.
- **supplementation**—Workers distribute special foods to malnourished individuals or to members of vulnerable groups, such as young children or pregnant women.

Nutrition education in itself may be an effective health measure where feeding practices and beliefs are the principal causes of poor nutrition. CBD workers can provide information on a wide variety of topics including the importance of breast-feeding, proper weaning foods, the need to continue feeding sick children, and the proper diet for pregnant women (313, 431) (see **Population Reports**, *Breast-Feeding, Fertility, and Family Planning,* J-24, November-December 1981). Unless supplements are also provided, however, their efforts will have an impact only if they can persuade families to change their daily behavior, especially the way available food is distributed (460). This is the chief difficulty for nutrition education. Furthermore, if household buying power or local agricultural capacity are the factors limiting the diet, nutrition education alone will not solve the problem (431).

Protein-calorie supplementation raises the practical problems of purchasing, storing, and distributing large amounts of food (353). The foods may be purchased locally or imported from donor countries. (Food imports, however, may discourage the use of local foods or local food production.) They may be ordinary foods such as milk or specially prepared weaning foods made of mixtures of cereals with plant or, occasionally, animal proteins (42, 182), although people may be reluctant to use these unfamiliar products. In either case the logistics of assuring a continuing supply is complex, and the cost is high. In most nutrition programs the annual cost per child fed has ranged from $10 to $30 (US). In rehabilitation centers providing day care for severe malnutrition cases and nutrition education for their mothers, the cost has been as high as $70 (24, 460).

The food supplements may be distributed for consumption at home or prepared and fed to the recipients in special feeding centers. Feeding centers have one major advantage: they are better able to see that the intended groups, such as children or pregnant women, consume the food. The severely malnourished and the youngest children may not come to the centers, however. When supplements are prepared and consumed at home they may be shared with or eaten entirely by other adults (147). Neither approach can prevent the family from substituting the supplement for regular food purchases, and using the money saved for other purposes (41, 300). This kind of sharing and substitution may absorb one-third to one-half of all the food distributed (24). Thus, with either approach, most programs have had disappointing results. Especially intense efforts would be necessary to reach those who need nutritional assistance most.

In Bangladesh a health worker weighs a child as part of a regular growth monitoring program. Monthly weighing can alert mothers to children's nutrition problems before a health crisis develops. (USAID)

Several diagnostic techniques can be used in nutrition programs, whether they are entirely educational or also involve protein-calorie supplementation. Periodic weighing to monitor children's growth is a common component of CBD nutrition programs (248, 308, 326, 342, 418) (see Table 2, pp. L-99–105). Weights are recorded on growth charts that compare the child's rate of growth with a normal growth curve (248). Measuring arm or thigh circumference with special bands is another way to assess a child's nutritional status (2, 82, 432). In an education program these techniques can be used to make all mothers more aware of their children's nutrition and to identify poorly nourished children who need special attention. In a supplementation program they may also serve to identify children who especially need the supplements (453). Of the two monitoring techniques, armbands are less expensive and require less training of workers (432), but measurement errors are easy to make. Weighing usually requires that mothers bring their children to a location in the village every month, but in theory weighing can provide an earlier warning of nutritional problems than armbands (308, 432). Both weight and armband monitoring activities and the accompanying nutrition education require substantial time from workers.

The impact of nutrition education and supplementation programs has been difficult to assess. Because of technical difficulties, lack of funds, and political considerations, relatively few nutrition projects have been evaluated (29). A 1976–77 survey of 140 nutrition projects around the world found that only 23 percent had analyzed nutritional status data (29). The evaluations that have been carried out have been hampered by a wide variety of methodological problems and confounding variables (41, 44, 144–147, 208). In a recent reevaluation of six well-documented nutrition projects, for example, Arnfried Kielman and colleagues found that, in three, results were less clear than originally reported and that all but one lacked adequate controls (193). Protein and calorie supplements appear to have had beneficial health effects in some projects (42, 145, 193, 208, 209, 362), but the evidence to date is so unclear and the resources required so great that integrated CBD programs may prefer to devote their efforts to other, more clearly feasible health measures. There is also some evidence that nutrition education may improve nutritional status (431, 436), although this evidence is even less compelling than in the case of supplementation.

Vitamin and Mineral Deficiencies

CBD programs can effectively address health problems caused by deficiencies of certain essential vitamins and minerals in the diet. While the fortification of common foods with the needed nutrient is beyond the capabilities of CBD, both nutrition education and distribution of vitamin and mineral supplements to deal with specific deficiencies are possible (32). As in the case of protein-calorie deficiencies, the value of educating people to change their diets is limited by the availability and cost of foods rich in a particular vitamin or mineral. In the case of vitamin A, education alone has a mixed record of effectiveness (343, 347, 449). By contrast, providing supplements regularly is a practical option for three widely prevalent deficiencies that cause serious health problems:

- vitamin A,
- iron and folate, and
- iodine deficiencies.

Volunteers in Honduras give children milk and vitamins daily. Protein-calorie supplements are expensive and difficult to store and transport, but distribution of vitamin A, iron tablets, or some oral form of iodine is much more feasible for CBD programs. (USAID)

Vitamin A. Vitamin A deficiency is one of the three most common causes of preventable blindness (343). An estimated one million children developed vitamin A-related eye problems (xerophthalmia) in 1976; 100,000 of them became blind (420). The problem is greatest in Asia and the Near East. Some areas of Africa and Latin America also are affected (420). Preschool children are most at risk (347).

In areas where xerophthalmia is a major health problem, CBD workers can distribute vitamin A capsules every four to six months to children under age five who have been weaned (167, 420). In programs in India and the Philippines, vitamin A given every four or six months substantially reduced eye problems (337, 343). In addition to distributing vitamin A tablets, CBD programs can emphasize, as a part of nutrition education, the need to eat more green leafy vegetables and yellow fruit.

Distributing vitamin A capsules has two advantages for integrated CBD programs as well as some special requirements. The supplies are relatively inexpensive—about $.05 (US) per capsule (167). The program also encourages regular home visits that make the CBD program more visible. The requirements are that workers:

- identify all children under age five,
- keep accurate records to ensure that every child has been covered and, because too frequent doses can be toxic (220), to ensure that children do not receive multiple doses or doses at less than 4- to 6-month intervals (167).

Iron and folate. Children and menstruating, pregnant, or lactating women are especially susceptible to nutritional anemia caused by iron deficiency, and, in the case of pregnant women, folate deficiency (161, 330). According to WHO, as many as two-thirds of the pregnant women and half the nonpregnant women in the developing world are anemic (416, 417). Where hookworm is prevalent, anemia may be a problem for all adults (34). Anemia can increase the incidence of maternal morbidity and mortality and of fetal wastage (128, 178, 214).

CBD workers could distribute iron supplements to all pregnant women and/or children and folate to pregnant women to prevent anemia (34). This is complicated, however, by the need for daily doses and, for iron, the frequency of side-effects and the difficulty of calculating doses for children on the basis of body weight. Smaller daily doses are better than larger, less frequent doses because a greater percentage of the iron is absorbed and because gastrointestinal side-effects—heartburn, nausea, and constipation—are fewer (119, 161). Motivating women and children to take the supplements every day, however, requires frequent visits by CBD workers—as often as every several weeks (167). Distributing iron also raises the problem of storing tablets out of children's reach, since serious iron poisoning is possible with an overdose (119). While distributing iron tablets to all the children in a village is therefore difficult, it may be feasible for the more limited number of pregnant women, especially when combined with other prenatal services.

Treatment of individual cases of moderate to severe anemia is also feasible in a CBD program. Diagnosis on the basis of clinical signs alone—pallor, pale conjunctiva and mucous membranes—is subtle, however, and so distributing supplements to an entire group, such as pregnant women, may be easier for workers.

Iodine. Maternal iodine deficiency during pregnancy may harm the fetus, causing endemic cretinism, a syndrome of mental retardation, deaf-mutism, and other neurological defects. Iodine deficiency also causes endemic goiter—enlargement of the thyroid gland—and may be associated with decreased mental performance (40, 350, 467). Although salt-fortification programs have reduced the problem in many areas, it remains a problem in parts of Africa, Asia, and South America. In these areas iodization of salt by producers is not possible because of localized salt production, geographic obstacles to distribution, lack of political support, or administrative ineffectiveness (474, 475). Thus in some areas there is a need to distribute iodine directly to individuals.

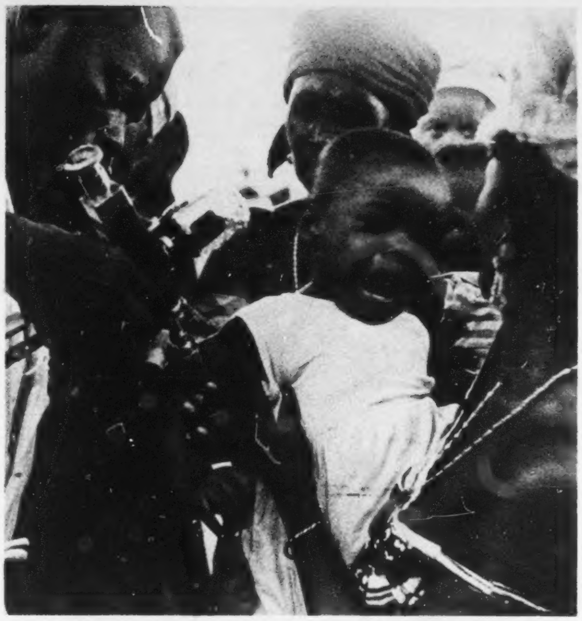
Intramuscular injections with iodized oil every three to five years shrink many existing goiters, prevent new goiters, and, when administered before a woman conceives, prevent endemic cretinism (68, 456, 458, 465, 474). The one complication, iodine-induced hyperthyroidism, is rare (228, 456). When delivered by mobile injection teams in a mass campaign, the injections also are cheap: less than $.50 (US) per person injected (293, 350, 474). CBD workers probably cannot deliver iodine injections as efficiently and economically as mobile teams, since giving injections requires special training and the injections are repeated so infrequently. CBD workers can supply valuable local support for mass campaigns, however, just as they can for immunization programs (see p. L-98).

The oral administration of iodine—as iodized oil or as potassium iodide tablets—is technically simpler than injections. Limited research has found that iodized oil taken orally is effective against goiter (40, 478) and may cause less hyperthyroidism (478). Potassium iodide tablets taken weekly reduced the prevalence of goiter in programs in Tasmania and Uruguay, despite irregular delivery of the tablets (441, 469). Both these approaches are suitable to CBD, but more work is needed to determine optimal dosage levels and frequency. Any iodine distribution program is likely to be popular because it will visibly shrink many existing goiters (68, 474).

IMMUNIZATION

Immunization is a crucial public health measure, since it can prevent some of the most common causes of child mortality. Most CBD projects, however, lack the personnel, equipment, and special skills to manage immunization programs. Therefore, the optimal role for CBD workers may be to support existing immunization programs wherever possible, acting as local advocates and helping to provide education, publicity, recordkeeping, and follow-up.

The childhood diseases diphtheria, tetanus, pertussis (or whooping cough), measles, and polio account for a substantial



A mobile team vaccinates children in Guinea against measles. While CBD programs cannot easily store and transport perishable vaccines, the CBD workers can provide education and publicity and encourage area residents to see that their children are vaccinated. (USAID)

portion of child mortality in the developing world (see Table 1). For example, measles is contracted by at least 90 percent of all unvaccinated children under five (18). It can lead to complications such as respiratory disease, diarrhea, and blindness; case-fatality rates in poorly nourished children may be as high as 10 percent (6, 159). Neonatal tetanus, which develops from an infection of the cut umbilical cord, accounted for two-thirds of all deaths during the first month of life, an Indian study found (335).

Highly effective vaccines are available for diphtheria, pertussis and tetanus (DPT), measles, and polio (18, 120, 351). The BCG vaccine against tuberculosis is less effective than the vaccines for these other diseases but may provide some protection (1, 18, 77, 367). These six diseases are the targets of the WHO Expanded Program of Immunization. WHO estimates the cost of full immunization to be at least $3 (US) per child. The cost of the vaccines themselves is less than $1 (18). In three Asian countries the cost of full immunization has ranged from $2.86 to $10.73 per person (99).

It is important to immunize pregnant women with tetanus toxoid. A pregnant woman passes the antibodies against the disease on to the fetus. This passive immunity offers the best protection against tetanus to the newborn child (351).

Technical Problems

While immunization programs are important, they involve sophisticated technology and complex logistics that are beyond the capabilities of most CBD programs. The major difficulty is maintaining the cold chain—that is, the refrigeration equipment and personnel needed to keep the vaccines at the proper temperature throughout their storage and distribution (18, 103, 270). If the cold chain breaks down, the vaccines lose their effectiveness (18, 215). Furthermore, the vaccines must be used before their expiration date, and some must be used on the same day the vial is opened (104). Thus the potential for wastage is enormous. For example, a small Bangladesh program administered 5,763 doses of tetanus toxoid over a 10-month period. In the same period 6,530 doses had to be destroyed because of electrical power failures that cut off refrigeration, an oversupply of vaccine with an imminent expiration date, and the daily disposal of left-over doses (232).

A further logistical difficulty is that each child must receive a series of vaccinations at specific intervals. Three visits are generally required, preferably during the first year of life (6, 18, 103, 407). This requires detailed record-keeping as well as a constant flow of supplies.

Role for CBD Workers

While CBD workers usually cannot operate an immunization program, they are ideally situated to aid immunization programs that make periodic visits to a village. CBD workers can help immunization campaigns and potentially increase immunization coverage (17) by:

- teaching families how important it is to have their children vaccinated,
- identifying candidates for vaccination,
- publicizing the immunization rounds,
- rebutting rumors that may arise (298),
- providing aspirin if fever occurs,
- reassuring parents that side-effects are minor and brief (360, 375),
- reminding people to return for the second and third injections in a series (360),
- maintaining household vaccination records.

Family planning CBD workers may be particularly helpful because of their contacts with women who have young children in need of immunizations.

The visits of immunization teams can be occasions to provide a range of primary health services, with CBD workers and medical professionals working together (440, 468). In Haiti "health rallies" were held quarterly at local "rally posts" accessible to 1,000 to 1,500 area residents. Workers provided health and nutrition education, weighed children to identify those in need of supplemental feedings, taught ORT, gave worm medication to all children age six months to three years, immunized children against DPT, polio, and measles, and inoculated everyone over age six with tetanus toxoid. For this program, volunteer, part-time "community collaborators" visited all homes to invite people to the rallies and afterwards visited homes to weigh the 14 percent of children who missed rally appointments (440). Coordination of an immunization campaign with CBD activities was also used in the Sudan Community Based Health and Family Planning Project, where midwives' household visits to offer first ORT, then oral contraceptives, then nutrition education were coordinated with immunization campaign visits held at 3-month intervals (302, 455) (see Table 2, p. L-103).

OTHER HEALTH MEASURES

A number of other health measures have been tried or suggested for community-based distribution (see Table 2). Among them are:

- oral or topical antibiotics, especially to treat respiratory tract infections and trachoma;
- painkillers such as aspirin; and
- simple first aid.

Of these, only antibiotics would treat important causes of mortality or serious morbidity. Severe respiratory tract infections such as bronchitis and pneumonia are a major cause of infant and child deaths in developing countries. The diagnosis and treatment of respiratory infections may be difficult for CBD workers, however. Antibiotics should be reserved for the bacterial infections that may benefit from them, so difficult diagnostic decisions may be required. Also, oral treatment generally requires multiple doses for up to several weeks, making it difficult to assure compliance. Injectable penicillin, the alternative to oral treatment, would introduce the danger of anaphylactic shock and death, although these are rare, and the problems of using, caring for, and storing drugs and syringes (402, 481). Perhaps because of these potential problems, community-based programs have seldom distributed antibiotics for treatment of respiratory infections.

Trachoma, a major cause of blindness (446), is often treated with tetracycline eye ointment. Treatment is prolonged—at least six to eight weeks of daily application for individual acute cases, and, commonly, two applications daily for five days each month for six months, repeated each year, in curative or prophylactic mass campaigns (446). The effect is short-lived—in one study lasting no more than six months before reinfection (445). Use of oral antibiotics is more promising for CBD, but still experimental (102, 444, 445).

Aspirin may be much in demand in many communities to relieve pain, to lower fever, and to reduce inflammation. The ability of aspirin to lower fever makes it a useful adjunct in the treatment of malaria, respiratory infections, and other illnesses. Distributing aspirin as a painkiller does not meet a major public health need but does respond to very common complaints and so is popular.

Minor cuts, sprains, and mild burns are, of course, quite frequent, and simple first aid measures have been included in many CBD programs. CBD workers often may be the only personnel with medical training available in an emergency, and so they will be called on (17). As with other measures, however, first aid requires special training. Workers must not go beyond emergency care and attempt tasks for which they are not qualified, such as setting broken bones. These should be handled by the backup medical system.

The list of primary health care services that community-based programs might try is long. Few programs, if any, can hope to offer them all, and so difficult choices must be made. Careful and deliberate as the planning for any one CBD service must be, the planning for an integrated program, offering a number of services, must be even more careful and deliberate. But detailed planning should not imply inflexible operations. Each program must monitor its activities and make changes when and where needed. Experience with integrated CBD projects is limited, and there are no guidelines that can be followed to guarantee success. As more and more projects are undertaken, however, it is important that they share their experiences of success and failure, helping to pave the way for those that follow.

Table 2. Selected Community-Based Integrated Family Planning and Health Projects

Region, Country, *Project Name*, Project Location, Dates (Ref. No.)	Approximate Size of Area	Contraceptives	Major Health Measures	Distributors	Training	Impact	
						Family Planning	Health
ASIA							
Afghanistan, *Village Health Workers Project,* 1977–79 (17, 266, 277, 346)	100,000 people	Pills, condoms.	Oralyte ORS, piperazine for worms, iron, multivitamins, nutrition education, penicillin, tetracycline eye ointment, aspirin, first aid.	131 male, 6 female part-time workers, paid commissions, chosen from community by village committee; each served 50–200 households from village depot.	3-week course taught by pairs of sanitarians from capital; 3 days further training every 3 months.	NA	NA
Bangladesh, Matlab Thana, 1977–82 (55–57, 233, 235, 383)	70 villages 80,000 people	Pills, condoms, foaming tablets, injectables.	Locally made packets of WHO-formula ORS, tetanus toxoid, iron and folic acid to pregnant women, nutrition and hygiene education.	80 full time, salaried workers, chosen by village residents and project personnel; each served about 1,000 people, visiting each household every 10 days.	7-week course taught by project supervisors; further training one day per week.	Prevalence: from 7% of MWRA in 1978 to 34% in 1979.	Infant, neonatal and postneonatal mortality rates slightly lower in project area than in comparison area in mid-1979.
India, *Narangwal Population Project, Punjab State, 1969–74** (194, 317, 364)	4 villages 5,500 people	Pills (resupply only), condoms, foaming tablets, IUDs.	None	4 female, 1 male full time, salaried workers, from outside of area, made occasional household visits and held meetings. Male worker distributed only condoms.	6–8 week training courses taught by project staff.	Prevalence: from 7% of MWRA in 1972 to 29% in 1974.	NA
	4 villages 5,000 people	As above.	Tetanus toxoid, iron, folic acid, and worm medication to pregnant women; maternal monitoring†; nutrition education.	3 female, 1 male, as above. Bimonthly visits.	As above.	Prevalence: from 9% of MWRA in 1969 to 41% in 1974.	NA

*During 1966–1974 there was also a Narangwal Nutrition Project in an adjacent area of Punjab State.

†Weight, blood pressure, urine, and hemoglobin checks

Table 2 Continued

Region, Country, *Project Name*, Project Location, Dates (Ref. No.)	**Approximate Size of Area**	**Contraceptives**	**Major Health Measures**	**Distributors**	**Training**	**Impact**	
						Family Planning	**Health**
	3 villages 4,900 people	As above.	As above plus child-weighing, nutrition supplements, immunizations, but no maternal monitoring.†	5 female, 1 male, as above. Biweekly visits. Women assisted by 6 full time, salaried women from area.	As above.	Prevalence: from 7% of MWRA in 1970 to 27% in 1974.	Mortality rates: neonatal—40% lower than in control villages, 1970–73; postneonatal—33% lower; ages 1–3—32% lower. Average days sick per child under age 3 also lower.
	4 villages 6,300 people	As above.	As above but with maternal monitoring.†	4 female, 1 male, as above. Monthly visits.	As above.	Prevalence: from 8% of MWRA in 1969 to 34% in 1974.	Mortality rates: neonatal—18% lower than in control villages during 1970–73; postneonatal—6% higher; ages 1–3, 63% lower.
	4 villages 5,400 people [control group]	None	None	None	None	NA	NA
India, *Indo-Dutch Project for Child Welfare,* Hyderabad District, Andhra Pradesh State, 1969–85 (451)	14 villages 40,000 people	NA	ORT, worm medication, nutrition surveillance of children under 5, treatment for scabies.	40 salaried female workers make frequent household visits.	Preliminary and ongoing.	NA	NA
India, Jamkhed area, Ahmednagar District, Maharashtra State, 1971– (27, 31, 451)	60 villages 80,000 people	Pills (resupply only), condoms.	Nutrition education, child-weighing, iron and vitamin pills to pregnant women, first aid, coordination with mass immunization campaigns.	60 female full time workers, nominated by village council and chosen by project staff, receive token monthly payments; each serves one village, making periodic household visits.	2 days/week classroom instruction by health center staff; 1 day/week field instruction by health team (doctor, nurse, social worker).	Prevalence: from 3% of MWRA in 1971 to 51% in 1976.	Infant mortality rate: from 97 per 1,000 in 1971 to 39 in 1976.
India, *Integrated Health Services Project,* Miraj area, Sangli District, Maharashtra State, 1973–77 (31, 451)	38 villages 230,000 people	NA	Smallpox, DPT, polio, and BCG immunizations; ORT with household ingredients; first aid.	173 traditional midwives and 40 female volunteers delivered services through household visits.	1 week.	Prevalence: from 31% of MWRA in 1974 to 89% in 1977.	Infant mortality rate: from 68 per 1,000 live births in 1974 to 23 in 1977.
India, *Padgha Project,* Maharashtra State, 1976–77 (31, 76)	104,000 people	NA	Malaria medications, first aid, health and sanitation education.	66 female, 66 male workers, paid nominal salaries, selected from the villages by village committees and project staff; each team of one male and one female worker served 300 households.	2-week field training by project staff, later 10-day course on environmental sanitation.	NA	NA
India, *Pilot Project of Comprehensive Rural Health,* Vadu area, Maharastra, 1977– (31, 258)	19 villages 61,000 people	NA	Nutrition and sanitation education, first aid.	39 male and female part-time, salaried workers, nominated by village authorities and chosen by project staff, make household visits.	3 weeks.	NA	NA

†Weight, blood pressure, urine, and hemoglobin checks

Table 2 Continued

Region, Country, *Project Name,* Project Location, Dates (Ref. No.)	Approximate Size of Area	Contraceptives	Major Health Measures	Distributors	Training	Impact	
						Family Planning	Health
India, ***Varanasi Community-Based Development Project,*** **Varanasi District, Uttar Pradesh, 1980–** (447, 448)	NA	Pills (resupply only), condoms, foaming tablets.	ORS, weaning formula, chlorine tablets for water, boric acid powder for conjunctivitis and skin rashes.	612 male and female part-time workers sell health measures and distribute contraceptives free through depots and follow-up household visits. Not all workers distribute all products.	Usually 1–2 days.	NA	NA
Indonesia, ***Village-Based Family Planning Project,*** **North Sulawesi, 1978–** (37)	150,000 people	Pills (mostly resupply), condoms, injectables (resupply only).	First aid, health education, treatment for gastrointestinal and respiratory tract illness.	82 female, 4 male salaried workers, selected from village by project staff, make periodic sweeps.	One-week course taught by hospital nursing school and clinic staff; some training also at bimonthly program meeting.	Prevalence: from about 30% of MWRA in 1978 to 67% in 1981.	NA
Indonesia, ***Integrated Village Family Planning/Nutrition/ORT Project,*** **primarily Java and Bali, 1980–** (154, 342, 358)	20,000 villages (1982)	Pills, condoms.	Oralyte ORS, child-weighing, iron to pregnant women, vitamin A to children ages 1–5.	About 6,000 full time, salaried male and female workers, chosen from local area by project staff; each serves 5,000–10,000 people (several villages); volunteers from Mothers' Clubs in sub-villages help with distribution and child-weighing.	Fieldworkers: 3-week course on family planning, 2-week course on nutrition. Volunteers: 3-day course.	NA	NA
Republic of Korea, Sunwon & Naega myuns, Kangwha gun (county), Gyeonggi Province, 1975– (427)	2 townships 12,000 people	Pills, condoms, foam.	Child-weighing, nutrition education, first aid.	Part-time, salaried female workers, nominated by village committee and chosen by project staff, make bimonthly visits.	4-week course taught by township health workers, health center staff, and project nursing supervisor; subsequent 10-day refresher course.	Ever-users of contraception: 38% of eligible women in 1974 to 72% in 1977.	Infant mortality rate: from 30.1 per 1,000 live births in 1975 to 21.8 in 1977.
Nepal, ***Panchayat-Based Health Worker Expansion Program of the Family Planning/ Maternal and Child Health Project,*** **1974–** (17, 139, 277, 476)	NA	Pills, condoms.	ORT; treatment for eye infection; first aid; multivitamins; iron; health, nutrition, and sanitation education, including arm circumference measurements.	714 full time, salaried village workers, mostly males, deliver services through household visits.	NA	Prevalence: from 2% of MWRA in 1975 to 4% in 1978.	Infant mortality rate: from 102 per 1,000 live births in 1975 to 76 in 1978.
Nepal, ***Integrated Community Health Services Project,*** **various districts, 1975–** (17, 277, 368, 476)	NA	NA	Chloroquine for malaria, piperazine for worms, vitamins, iron, tetracycline, aspirin.	1,500 full time salaried male workers visit each household in their areas every 2–6 months.	6 weeks.	Prevalence: from 2% of MWRA in 1975 to 5% in 1978.	Infant mortality rate: from 102 per 1,000 live births in 1975 to 65 in 1978.
	100 villages	NA	Home preparation of OR solution, child height measurement, nutrition, hygiene, and sanitation education, first aid.	1,000 male and female, unpaid workers serve about 90 households each.	24-day course taught by health post staff.	NA	NA
Philippines, Bulacan, Cebu, & Zamboanga del Norte, 1979– (224)	24 villages (barangays)	Pills (resupply only), condoms.	Nutrition education, first aid.	241 male and female part-time volunteer village residents chosen by village midwife and village council.	5-day course taught by village midwife.	NA	NA
Philippines, northwestern Bohol Province, 1976–80 (272, 273, 408)	400,000 people	Pills, condoms, IUDs, injectables.	Tetanus toxoid; tuberculosis, DPT immunizations; obstetrical care; first aid.	133 full time, salaried professional midwives, chosen by project staff, made regular home visits and provided services from depots.	4–6 week courses taught by provincial health office staffs.	Prevalence: from 20% of MWRA in 1976 to 43% in 1980.	No infant and child mortality decline, 1976–1980.

Table 2 Continued

Region, Country, *Project Name,* Project Location, Dates (Ref. No.)	Approximate Size of Area	Contraceptives	Major Health Measures	Distributors	Training	Impact	
						Family Planning	Health
Philippines, Panay Island, 1978–82 (17, 40, 277)	600 villages 340,000 people	Pills (resupply only), condoms.	Child-weighing, nutrition and sanitation education.	600 full time, salaried male and female workers, nominated by the village and chosen by project staff; each worker serves village through a depot.	6-week course taught by area health personnel; 2 weeks further training every 6 months.	NA	NA
Thailand, Lampang District, 1974– (95, 301, 385, 393)	538 villages 650,000 people	Pills (resupply only), condoms.	Malaria medication, child-weighing, protein supplements, first aid.	570 male and female part-time workers, chosen by village health committee, paid commissions; each served a village or part of village from a home depot.	2-week course taught by area health personnel and project staff; 1-day refresher training annually.	Prevalence: from 50% of MWRA in 1974 to over 60% in 1979.	25% of 77 seriously malnourished children studied for 6+ months showed improvement in nutritional status.
Thailand, *Community-Based Family Planning Services (CBFPS)/Family Planning Health and Hygiene Project,* various areas, 1977–81 (71, 80)	20 districts 1.4 million people	Pills, condoms.	None	About 1,450 male and female part-time distributors from area, paid commissions for sales from village depots (often shops).	One-day course taught by CBFPS central staff.	NA	NA
	20 districts 1.4 million people	Pills, condoms.	None	About 1,450, as above, except each made one sweep of area households and gave 2 cycles of pills and/or condoms, then offered resupply through depot sales.	As above.	NA	NA
	20 districts 1.4 million people	Pills, condoms.	First aid medications, worm medication.	About 1,450, as above, sold contraceptives and household drugs from village depots.	2-day course taught by CBFPS central staff.	After 2 years, integration did not make contraceptive distribution more cost-effective.	NA
	20 districts 1.4 million people	Pills, condoms.	First aid medications, worm medication.	About 1,450, as above, made one sweep of area households, gave out 2 cycles of pills and/or condoms, then offered resupply through depot sales.	As above.	As above.	NA
	4 districts 0.3 million people [control area]	None	None	None	None	—	—
Thailand, *CBFPS Integrated Family Planning and Parasite Control Project,* 1976–80 (377, 387, 477)	12 villages	Pills, condoms.	Pyrantel pamoate for worms, traditional remedy for worms made from maklua fruit.	Every 6 months distributors—local government officials and CBFPS staff—visited villages to give blanket treatment for worms and later collect stool samples. Worm medications and contraceptives distributed year-round at permanent CBFPS posts.	One-day course on parasite control for all CBFPS distributors, later a 2-day course on integration; taught by CBFPS staff and local government officials. (3 previous 1-day courses on contraceptive distribution.)	Prevalence: from 53% of MWRA in 1977 to 71% in 1980.	Prevalence: hookworm—from 71% in 1977 to 13% in 1980; roundworm—from 8% in 1977 to 2% in 1980.
	12 villages	No project services.	As above.	As above: no CBFPS posts.	None	Prevalence: from 45% of MWRA in 1977 to 58% in 1980.	Prevalence: hookworm—from 64% in 1977 to 16% in 1980; roundworm—from 17% in 1977 to 2% in 1980.
	12 villages	Pills, condoms.	No project services.	CBFPS distributors of various types; most served through depots.	(3 previous one-day courses on contraceptive distribution.)	Prevalence: from 52% of MWRA in 1977 to 70% in 1980.	Prevalence: hookworm—from 71% in 1977 to 48% in 1980; roundworm—from 4% in 1977 to 3% in 1980.
	12 villages [control area]	No project services.	No project services.	None	None	Prevalence: from 47% of MWRA in 1977 to 54% in 1980.	Prevalence: hookworm—from 68% in 1977 to 53% in 1980; roundworm—from 15% in 1977 to 10% in 1980.

Table 2 Continued

Region, Country, *Project Name*, Project Location, Dates (Ref. No.)	Approximate Size of Area	Contraceptives	Major Health Measures	Distributors	Training	Impact	
						Family Planning	Health
AFRICA & MIDDLE EAST							
Egypt, Menoufia Governorate, 1978–81 (229, 233, 263, 264, 366, 383)	104 villages 500,000 people (Year 1)	Pills, foaming tablets.	Oralyte ORS.	Teams of high school-educated female volunteers from area made sweep of households.	2-week course taught by staff of American University in Cairo.	Prevalence: from 19% of MWRA in 1978 to 23% in 1980.	Mini-survey found ORS used in 61% of 348 diarrhea episodes; no effect on mortality.
	200 villages (Years 2 & 3)	Pills, foaming tablets.	None	As above.	One-week course.	NA	With household visits, ORS used in 58% of diarrhea episodes; with depots, in 35%.
		None	Oralyte ORS.	Teams of college-educated female volunteers distributed ORS through household visits in some areas; depots in others.	2-week course.		
Ghana, *CBD area, Danfa Project,* 1977–78 (130)	9 villages 2,700 people	Pills, condoms, foam.	Chloroquine for malaria, worm medication, nutrition education, penicillin, aspirin, cough mixture, kaolin.	15 male, 5 female part-time, volunteer village residents, nominated by village committees; each served part of a village through some sweeps and village depot.	11-week course (10 hours/week) taught by public health nurse, sanitarian, and health center superintendant.	NA	NA
Morocco, Expanded *Visite à Domicile de Motivation Systématique (VDMS)* Project, Beni Mella El Jadida & Meknes Provinces, 1982– (211)	2.5 million people	Pills, condoms.	Oralyte ORS packets, malaria medications, iron and vitamins to pregnant and lactating women, weaning food.	500 male and female full-time, salaried workers, chosen by project staff, visit each household in their districts of 1,500–4,500 people every 6 months.	1–2 week course taught by project training staff.	NA	NA
Nigeria, Oyo State 1980–82 (202, 383)	85,000 people	Pills, condoms, foaming tablets.	Oralyte ORS, chloroquine for malaria, mebendazole for worms, vitamins, cough medicine, first aid.	171 traditional birth attendants and male health center workers, selected by project staff and village committees and paid commissions; each serves 500–1,000 people through household visits.	3-week course taught by project co-director, university nurses, and government midwives; bimonthly in-service training and periodic refresher courses.	NA	NA
Sudan, *Community Based Health and Family Planning Project,* Khartoum Province, 1979–83 (87, 151, 205, 302, 383)	125,000 people	Pills	Oralyte ORS, nutrition education, coordination with mass immunization campaigns.	About 80 salaried government midwives made one sweep for each health measure and one for family planning; sweeps coordinated with immunization program.	3-week course taught by government midwife trainers and project staff; 1-day course before each sweep.	NA	NA
Tunisia, Jendouba Governorate, 1977–79 (149, 217, 461)	(Fernana Delegation) 41,800 people	Pills, condoms, foam.	None	Team of 5 full time, salaried female workers from area made 2 sweeps, 6 months apart, of all households.	2-week course.	Prevalence: from 16% of MWRA in 1977 to 23% in 1979.	NA
	(Jendouba Delegation) 68,149 people	Pills, condoms, foam.	None	As above; team made one sweep.	As above.	Prevalence: from 33% of MWRA in 1977 to 39% in 1979.	NA
	(Ain Draham Delegation) 34,057 people	Pills, condoms, foam; foaming tablets (2nd round only).	Child weight and height measurement, tetracycline ointment for conjunctivitis; Oralyte ORS (2nd round only).	As above; two sweeps; male driver distributed condoms to men.	As above.	Prevalence: from 24% of MWRA in 1977 to 29% in 1979.	90% of women surveyed who had been given Oralyte packets and whose children had diarrhea used the packets.

Table 2 Continued

Region, Country, *Project Name,* Project Location, Dates (Ref. No.)	Approximate Size of Area	Contraceptives	Major Health Measures	Distributors	Training	Impact	
						Family Planning	Health
Zaire, ***Family Education Project (PRODEF),*** **Bas-Zaire,** **1981–83** (52, 53, 398)	35 villages 56,000 people	Pills, condoms, foam, foaming tablets.	Oralyte ORS, chloroquine for malaria, mebendazole for worms, aspirin.	Teams of 5–6 full time, salaried female workers, chosen by project staff, visit each village and hold a meeting, followed by distribution; 2 more sweeps of all households are held after 6 months and 1 year; resupply through depot run by female volunteer in each village.	12-day course taught by 2 donor-agency consultants and project medical director.	NA	NA
LATIN AMERICA & CARIBBEAN							
Brazil, **(BEMFAM CBD Project),** **Oeiras County,** **Piaui State** **1979–85** (306)	47,000 people	Pills	Pyrantel pamoate for worms.	Teachers at 41 schools distribute pyrantel pamoate; at 15 of these schools teachers also distribute pills; pills also distributed through BEMFAM family planning posts.	NA	NA	Worm infestation rate declined from 45% to 10% after first year of project.
Colombia, **Boyaca Department,** **1978–81** (126, 137)	6 towns 12,000–15,000 people	Pills, foaming tablets; condoms (after 1st year).	Worm medications, health and sanitation education, first aid, height & weight measurement of small children (1st year only).	25 full time, salaried female workers from area made monthly sweeps with contraceptives and educational activities and every 4 months with worm medications as well.	12-week course at school for auxiliary nurses.	Prevalence: from 6.7% of MWRA to 16.2% in 2 years.	NA
	6 towns 12,000–15,000 people	None	As above.	As above, but no contraceptives distributed.	As above.	Prevalence: from 9.3% of MWRA to 14.8% in 2 years.	NA
	6 towns 12,000–15,000 people	Pills, foaming tablets; condoms (after first year).	Health and sanitation education, first aid.	As above; contraceptives but no worm medications distributed.	As above.	Prevalence: from 5.5% of MWRA to 13.8% in 2 years.	NA
Colombia, **(PROFAMILIA CBD Project),** **Tolima State,** **1979–85** (3, 136, 250)	Rural areas of 16 municipalities	Pills, condoms, foaming tablets, vaginal suppositories.	Pyrantel pamoate for worms.	PROFAMILIA outlets such as stores and pharmacies sell contraceptives and worm medications; field workers distribute worm medications free in 261 schools.	NA	NA	NA
El Salvador, ***Rural Health Aide Project,*** **1977–** (17, 277)	11,800 families	Pills, condoms.	ORS and antidiarrhetic; mebendazole for worms; nutrition, hygiene, and environmental education; tetracycline eye ointment; first aid.	265 full time salaried workers, mostly males, chosen from community by project staff and community members; each worker delivers services through household visits.	10-week initial course plus 2 weeks' in-service training per year.	NA	NA
Guatemala, **(APROFAM-FECOAR Project),** **1977–79** (69, 383)	50,000 people	Pills, condoms, foam, foaming tablets.	Analgesic, cough medicine.	183 distributors, chosen by APROFAM staff and in some cases nominated by local leaders, sold all supplies, paid commissions.	NA	NA	NA
Guatemala, ***Integrated System for Nutrition and Primary Health Care (SINAPS),*** **1979–83** (17, 134, 277, 383)	75,000 people [plus control group of 75,000]	Pills, condoms.	Oralyte ORS, first aid, nutrition education, food supplements; mass campaigns and household visits for immunizations against measles, DPT, polio, and tuberculosis; mass campaigns for child-weighing.	385 full-time, unsalaried workers, mostly female, chosen by village committees and supervisors; each visits 30–50 households at least bimonthly and cooperates with mass campaigns.	One day/week for first 20 weeks, later one day/month, taught by rural health technicians (who also supervise workers).	Prevalence: from 14% of MWRA in 1980 to 17% in 1981.	Infant mortality: from 92 per 1,000 live births in 1980 to 45 in 1981. Use of ORS: from 1% of diarrhea cases in 1980 to 38% in 1981. Vaccination: about 90% of population covered. Nutrition: about 90% of malnourished receiving supplements.

Table 2 Continued

Region, Country, Project Name, Project Location, Dates (Ref. No.)	Approximate Size of Area	Contraceptives	Major Health Measures	Distributors	Training	Impact: Family Planning	Impact: Health
Guatemala, ***Rural Health Promoter Training Research Project (PRINAPS),*** **1979–83** (17, 277, 383)	120,000 people	Pills, condoms, foaming tablets.	Oralyte ORS, piperazine and mebendazole for worms, vitamins, arm circumference bands for nutrition monitoring, aspirin, first aid.	200 single males and 100 married couples, full time, paid commissions; each serves about 50 households from depot and through some household visits.	Half of workers trained in 4-week course taught by Ministry of Health training staff; half trained in modified 3-week course using self-programmed learning manual.	NA	NA
Haiti, ***Integrated Project of Health and Population,*** **1975–78** (318, 439)	3 regions 30,000 people	Pills, (resupply only), condoms, foam.	ORS, nutrition monitoring and education, some nutrition supplements.	15 full time, salaried workers, mostly male, made frequent household visits and coordinated visits of health team every 3 months. Each worker assisted by 4–5 part-time, volunteer community collaborators.	6-week initial course; periodic additional training.	Crude birth rate declines, 1975–78: 48 per 1,000 to 40; 46 to 38; and 33 to 31 in the three regions.	NA
Haiti, ***Maternal Child Health/Family Planning Project No. 2,*** **1978–** (17, 277)	NA	NA	ORS and antidiarrhetic, chloroquine for malaria, vitamin and iron supplements, penicillin.	540 part-time, salaried female workers.	3 months.	NA	NA
Haiti, ***Rural Health Delivery System,*** **1980–** (17, 277)	NA	NA	ORS, chloroquine for malaria, vitamin and iron supplements, penicillin, aspirin.	300 part-time, salaried, male and female workers, chosen from community by project staff and community members.	6–8 weeks.	NA	NA
Mexico, San Pablo Autopan, 1976–77 (233, 235, 383)	1 village 8,000 people	Pills, condoms, injectables. (IUDs through village health center.)	Worm medication; BCG, DPT, and polio immunization; first aid.	5 female community members previously trained in nurse-hygienists' course and 4 female, 1 male traditional health practitioners visited households and staffed depots.	3-week course taught by university staff and Ministry of Health trainers.	Prevalence: from 7% of MWRA to 34% over 21-month period in 1976–77.	NA
Mexico, ***New Strategies for the Delivery of Maternal/Child Health and Family Planning Services Project,*** **Chihuahua, Michoacan, & Oaxaca States, 1977–81** (187, 383, 442, 450, 463)	425,000 people	Pills, condoms, injectables.	Mebendazole for worms, iron to anemic women, medications for diarrhea, antibiotic eye ointment, aspirin, cough medicine, first aid.	502 male and female workers, chosen by project staff and community leaders, visited households and staffed depots.	4–6 week course taught by supervisors with help of district health personnel.	Prevalence: 21% in 1980 (compared with 17% national average for areas of less than 15,000 population in 1978).	NA
Mexico, ***Rural Health Program,*** **1977–** (97, 332, 443)	13,000 villages	Pills, condoms, injectables.	Nutrition education, first aid.	6,000 part-time, salaried female workers, nominated by community and chosen by project staff, visit households and staff depots.	6–10 weeks.	NA	NA
Nicaragua, ***Partéra Project,*** **1976–79** (157, 383)	720,000 people	Pills, condoms.	Oralyte ORS, mebendazole for worms, vitamin and iron supplements, nutrition education, aspirin, obstetrical care.	768 local traditional midwives, selected by project staff, paid commissions.	5-day course taught by team of 1 graduate nurse and 3 (later 5) auxiliary nurses.	Prevalence: from 4% of MWRA in 1977 to 6% in 1978.	NA

NA = not available
DPT = diphtheria, pertussis, tetanus
MWRA = married women of reproductive age
ORS = oral rehydration salts
WHO = World Health Organization

Erratum: In the French, Portuguese, and Spanish editions of **Population Reports**, J-24, *Breast-Feeding, Fertility, and Family Planning*, the flow chart entitled "Suggested Guidelines for Steroidal Contraception by Breast-Feeding Women in Developing Countries" was prepared by Dr. Miriam Labbok, Assistant Professor, Department of Population Dynamics, Johns Hopkins School of Hygiene and Public Health. Credit was inadvertently omitted from these publications. The information in this chart will appear in a letter to the editor from Dr. Labbok in a forthcoming issue of the New England Journal of Medicine.

BIBLIOGRAPHY

Asterisk (*) designates an article that was of particular value in the preparation of this issue of **Population Reports.**

1. ANONYMOUS. BCG vaccines: tuberculosis experts to discuss lack of protection. WHO Chronicle 34(3): 118-119. March 1980.

2. ANONYMOUS. Colombia: improved arm circumference tapes. Salubritas 6(3): 1. July 1982.

3. ANONYMOUS. Colombia: the integrated program in Colombia. In: Asian Parasite Control Organization [APCO]. The Seventh Asian Parasite Control/Family Planning Conference, Manila, Philippines, October 6-10, 1980: proceedings. Tokyo, APCO Secretariat, [1981]. p. 86-92.

4. ANONYMOUS. Home-made oral rehydration solutions: feasibility study in Nepal. WHO Chronicle 34(12): 496-497. December 1980.

5. ANONYMOUS. Indonesia country report. In: Atkins, B.S. Maternal and Child Health/Family Planning Program Technical Workshop, New York. October 31-November 2, 1979: proceedings. New York, Population Council, June 1980. p. 28-73.

6. ANONYMOUS. Measles in the tropics. British Medical Journal 2(6048): 1339-1340. December 4, 1976.

7. ANONYMOUS. Progress report on the integrated project of family planning and parasite control in Sawah Lunto (West Sumatra) Indonesia. In: Asian Parasite Control Organization [APCO]. The Third Conference of the Asian Parasite Control Organization, Tokyo, October 20-25, 1976: proceedings. Tokyo, APCO Secretariat, [1977]. p. 177-221.

8. ANONYMOUS. Taiwan: integrated projects in Taiwan. ROC: progress report. In: Asian Parasite Control Organization [APCO]. The Seventh Asian Parasite Control/Family Planning Conference, Manila, Philippines, October 6-10, 1980: proceedings. Tokyo, APCO Secretariat, [1981]. p. 162-187.

9. ANONYMOUS. Yozgat MCH/FP Project—Turkey country report. In: Atkins, B.S. Maternal and Child Health/Family Planning Program Technical Workshop, New York, October 31-November 2, 1979: proceedings. New York, Population Council, June 1980. p. 74-85.

10. ABEL-SMITH, B. Health priorities in developing countries: the economist's contribution. International Journal of Health Services 2(1): 5-12. February 1972.

11. ACADEMY FOR EDUCATIONAL DEVELOPMENT. Building a network of effective providers. [Washington, D.C.], Academy for Educational Development, December 1981. (Field Notes No. 5) 7 p.

12. ACADEMY FOR EDUCATIONAL DEVELOPMENT. Packets: do visual instructions make a difference? [Washington, D.C.], Academy for Educational Development, April 1981. (Field Notes No. 1) 6 p.

13. AIKEN, M. and HAGE, J. Organizational interdependence and intra-organizational structure. American Sociological Review 33(6): 912-930. December 1968.

*14. ALDANA, D. and DE LEON MENDEZ, J.R. Research program for the training of rural health promoters (PRINAPS). Presented at the Workshop on Family Planning and Health Components in Community Based Distribution (CBD) Projects, Charlottesville, Virginia, January 12-14, 1982. 45 p.

15. ALTMAN, D.L. and PIOTROW, P.T. Social marketing: does it work? Population Reports, Series J, No. 21. Baltimore, Johns Hopkins University, Population Information Program, January 1980. 52 p.

16. AMERICAN PUBLIC HEALTH ASSOCIATION. Community health education in developing countries. Washington, D.C., Peace Corps, September 1981. (Peace Corps Information Collection and Exchange Manual M-8, 1978) 209 p.

*17. AMERICAN PUBLIC HEALTH ASSOCIATION [APHA]. INTERNATIONAL HEALTH PROGRAMS. AID-assisted primary health care projects: summary reviews. Washington, D.C., APHA, 1981. 436 p.

*18. AMERICAN PUBLIC HEALTH ASSOCIATION [APHA]. INTERNATIONAL HEALTH PROGRAMS. Immunizations. Experimental ed. Washington, D.C., APHA, [1981]. (Primary Health Care Issues) 43 p.

*19. AMERICAN PUBLIC HEALTH ASSOCIATION [APHA]. INTERNATIONAL HEALTH PROGRAMS. Report of Strategy Advisory Group on anti-malaria support strategy for tropical Africa: conclusions and recommendations of Strategy Advisory Group together with findings of Abidjan Workshop, March 27, 1980. Washington, D.C., APHA, April 18, 1980. 175 p. (Contract No. AID/SOD/PDC-C-0164)

20. AMERICAN PUBLIC HEALTH ASSOCIATION [APHA]. INTERNATIONAL HEALTH PROGRAMS. The state of the art of delivering low cost health services in less developed countries: a summary study of 180 health projects. Washington, D.C., APHA, January 1977. 104 p.

*21. AMERICAN UNIVERSITY IN CAIRO. SOCIAL RESEARCH CENTER. Integrated social services delivery system: Menoufia. Interim Progress Report on Research Component and Family Planning and Health Interventions, September 1, 1980-February 28, 1982. (AID Grant No. 253-78-G-008) March 1982. 48 p. (Unpublished)

22. ANDERSEN, H.T. and BARKVE, H. Iron deficiency and muscular work performance. Scandinavian Journal of Clinical & Laboratory Investigation (Suppl. 114): 62 p. 1970.

23. ANDERSON, M.A. Comparison of anthropometric measures of nutritional status in preschool children in five developing countries. American Journal of Clinical Nutrition 32(11): 2339-2345. November 1979.

24. ANDERSON, M.A., AUSTIN, J.E., WRAY, J.D., and ZEITLIN, M.F. Supplementary feeding. In: Austin, J.E. and Zeitlin, M.F., eds. Nutrition intervention in developing countries: an overview. Cambridge, Massachusetts, Oelgeschlager, Gunn & Hain, 1981. p. 25-48.

25. ANDERSON, R.M. and MAY, R.M. Population dynamics of human helminth infections: control by chemotherapy. Nature 297(5867): 557-563. June 17, 1982.

26. ANNEL, M.V. Evaluation—a tool or a burden? In: Campbell, J.M., ed. International health: measuring progress. (Proceedings of the 1980 International Health Conference, Washington, D.C., June 11-13, 1980) Washington, D.C., National Council for International Health, 1980. p. 47-49.

27. AROLE, M. and AROLE, R. A comprehensive rural health project in Jamkhed (India). In: Newell, K.W., ed. Health by the people. Geneva, World Health Organization, 1975. p. 70-90.

28. ARONSSON, B., BENGTSSON, E., BJÖRKMAN, L., PEHRSON, P.O., ROMBO, L., and WAHLGREN, M. Chloroquine-resistant falciparum malaria in Madagascar and Kenya. Annals of Tropical Medicine and Parasitology 75(4): 367-373. August 1981.

29. AUSTIN, J.E. The perilous journey of nutrition evaluation. American Journal of Clinical Nutrition 31(12): 2324-2338. December 1978.

30. AUSTIN, J.E., BELDING, T.K., BROOKS, R., CASH, R., FISHER, J., MORROW, R., PIELEMEIER, N., PYLE, D., WRAY, J.D., and ZEITLIN, M.F. Integrated nutrition and primary health care programs. In: Austin, J.E. and Zeitlin, M.F., eds. Nutrition intervention in developing countries: an overview. Cambridge, Massachusetts, Oelgeschlager, Gunn & Hain, 1981. p. 123-135.

31. AUSTIN, J.E., BELDING, T.K., BROOKS, R., CASH, R., FISHER, J., MORROW, R., PIELEMEIER, N., PYLE, D., WRAY, J.D., and ZEITLIN, M.F. Integrated nutrition and primary health care programs. Cambridge, Massachusetts, Oelgeschlager, Gunn & Hain, 1981. 255 p.

32. AUSTIN, J.E., BELDING, T., FERNANDEZ, T., LATHAM, M., POPKIN, B., PYLE, D., and SOLON, F. Fortification. In: Austin, J.E. and Zeitlin, M.F., eds. Nutrition intervention in developing countries: an overview. Cambridge, Massachusetts, Oelgeschlager, Gunn & Hain, 1981. p. 73-84.

*33. AUSTIN, J.E. and ZEITLIN, M.F., eds. Nutrition intervention in developing countries: an overview. Cambridge, Massachusetts, Oelgeschlager, Gunn & Hain, 1981. 227 p.

34. BAKER, S.J. and DEMAEYER, E.M. Nutritional anemia: its understanding and control with special reference to the work of the World Health Organization. American Journal of Clinical Nutrition 32(2): 368-417. February 1979.

35. BARNETT, A., CREESE, A.L., and AYIVOR, E.C.K. The economics of pharmaceutical policy in Ghana. International Journal of Health Services 10(3): 479-499. 1980.

36. BARNUM, H.N. Economic analyses of proposal: expanded national immunization proposal and malaria control program for Outer Islands, Republic of Indonesia. [Washington, D.C.], American Public Health Association, International Health Programs, 1978. 78 p.

37. BARTEN, J., SUPIT, B.A., and HARIANTO, P. Village-based family planning in north Sulawesi. Pathpapers, No. 8, September 1981. p. 3-20.

38. BASTA, S.S., SOEKIRMAN, KARYADI, D., and SCRIMSHAW, N.S. Iron deficiency anemia and the productivity of adult males in Indonesia. American Journal of Clinical Nutrition 32(4): 916-925. April 1979.

39. BATES, J.A., HARTMAN, A.F., O'CONNOR, R.W., QUICK, J.D., and ROUSSELLE, P.J. Procurement and use of drugs: managing the process to advantage. In: Zatuchni, G.I., Sobrero, A.J., Speidel, J.J., and Sciarra, J.J., eds. Vaginal contraception: new developments. Hagerstown, Maryland, Harper & Row, 1979. p. 325-335.

*40. BAUTISTA, A., BARKER, P.A., DUNN, J.T., SANCHEZ, M., and KAISER, D.L. The effects of oral iodized oil on intelligence, thyroid status, and somatic growth in school-age children from an area of endemic goiter. American Journal of Clinical Nutrition 35(1): 127-134. January 1982.

41. BEATON, G.H. Evaluation of nutrition interventions: methodologic considerations. American Journal of Clinical Nutrition 35(5, Suppl.): 1280-1289. May 1982.

*42. BEATON, G.H. and GHASSEMI, H. Supplementary feeding programs for young children in developing countries. American Journal of Clinical Nutrition 35(4, Suppl.): 864-916. April 1982.

43. BEAVER, P.C. Biology of soil-transmitted helminths: the massive infection. Health Laboratory Science 12(2): 116-125. April 1975.

44. BÉHAR, M., SCRIMSHAW, N.S., GUZMÁN, M.A., and GORDON, J.E. Nutrition and infection field study in Guatemalan villages, 1959-1964: 8. An epidemiological appraisal of its wisdom and errors. Archives of Environmental Health 17: 814-827. November 1968.

45. BELCHER, D.W., NICHOLAS, D.D., and BLUMENFELD, S.N. Factors influencing utilization of a malaria prophylaxis programme in Ghana. Social Science and Medicine 9(4-5): 241-248. April-May 1975.

46. BENENSON, A.S. Malaria. In: Control of communicable diseases in man. 12th ed. Washington, D.C., American Public Health Association, 1975. p. 189-197.

47. BENJAMIN, V. and MUKHOPADHYAY, M. Mid-term evaluation of the Comprehensive Health and Development Project Pachod, Aurangabad District, Maharashtra, India. Evaluation report of the Pachod Programme submitted to OXFAM. [1981]. 21 p. (Unpublished)

48. BERGGREN, W. Implementation of primary health care: supervision, information and evaluation. In: Brems, S. Message from Calcutta: highlights of the 3rd International Congress of the World Federation of Public Health Associations [WFPHA] and the 25th Annual Conference of the Indian Public Health Association. (Primary Health Care: World Strategy, Calcutta, India, February 23-26, 1981) Washington, D.C., WFPHA Secretariat, 1982. p. 116-119.

49. BERGGREN, W.L., EWBANK, D.C., and BERGGREN, G.G. Reduction of mortality in rural Haiti through a primary health care program. New England Journal of Medicine 304(22): 1324-1330. May 28, 1981.

50. BERMAN, P.A. Selective primary health care: is efficient sufficient? Social Science and Medicine 16(10):1054-1059. 1982.

51. BERTRAN, M. and EGEMEN, A. ORT: the Turkish experience. WHO Chronicle 33(4): 132. April 1979.

52. BERTRAND, J.T. PRODEF: the Bas-Zaire Family Planning Project. April 1982. 9 p. (Unpublished, limited availability)

53. BERTRAND, J.T. Zaire Family Planning Operations Research Project: 18-month progress report: November 1980-March 1982. April 30, 1982. 12 p. (Unpublished)

*54. BERTRAND, J.T., PINEDA, M.A., SANTISO G., R., and HEARN, S. Characteristics of successful distributors in the community-based distribution of contraceptives in Guatemala. Studies in Family Planning 11(9-10): 274-285. September-October 1980.

55. BHATIA, S. Family planning and health in rural Bangladesh. Presented at the Workshop on Family Planning and Health Components in Community Based Distribution (CBD) Projects, Charlottesville, Virginia, January 12-14, 1982. 24 p.

56. BHATIA, S. Training community health workers in rural Bangladesh. World Health Forum 2(4): 491-494. 1981.

*57. BHATIA, S., MOSLEY, W.H., FARUQEE, A.S.G., and CHAKRABORTY, J. The Matlab family planning-health services project. Studies in Family Planning 11(6): 202-212. June 1980.

58. BLACK, R.E., MERSON, M.H., BROWN, K.H., RAHMAN, A.S.M.M., YUNUS, M., ALIM, A.R.M.A., LOTTIDGE, V.A., YOLKEN, R.H., and CURLIN, G. Epidemiologic studies of acute gastroenteritis in Bangladesh. Presented at the U.S./Japan Cooperative Medical Science Program, 13th Joint Conference on Viral Diseases, Atlanta, Georgia, October 1979. 4 p.

59. BLACK, R.E., MERSON, M.H., HUQ, I., ALIM, A.R.M.A., and YUNUS, M. Incidence and severity of rotavirus and *Escherichia coli* diarrhea in rural Bangladesh: implications for vaccine development. 1980. 7 p. (Unpublished)

60. BLUMENFELD, S. [Excerpts from comments on "Role of the private voluntary organization in the National Primary Health Care Program of the Sudan" and "Community owned and financed primary health care in Chad"] Presented at the 1982 International Health Conference, Washington, D.C., June 13-16, 1982. 1 p. (Unpublished)

61. BLUMENTHAL, D.S. and SCHULTZ, M.G. Incidence of intestinal obstruction in children infected with *Ascaris lumbricoides*. American Journal of Tropical Medicine and Hygiene 24(5): 801-805. 1975.

62. BOLTON, J.M., PARADO, J.P., and RAZALO, F.S. Innovations in service delivery in the Bohol Project. In: Atkins, B.S., ed. Maternal and Child Health/Family Planning Program Technical Workshop, New York, October 31-November 2, 1979: proceedings. New York, Population Council, June 1980. p. 148-163.

63. BOMGAARS, M.R. Practical evaluation for primary health care programs. In: Smith, R.A., ed. Manpower and primary health care. Honolulu, University Press of Hawaii, 1978. p. 151-167.

*64. BOMGAARS, M.R. Primary health care program operations. In: Smith, R.A., ed. Manpower and primary health care. Honolulu, University Press of Hawaii, 1978. p. 129-150.

65. BORDES, A. Commercial distribution: new focus in Haiti. Forum 3(1): 7-9. April 1980.

66. BROWN, K.H., GILMAN, R.H., KHATUN, M., and AHMED, Md.G. Absorbtion of macronutrients from a rice-vegetable diet before and after treatment of ascariasis in children. American Journal of Clinical Nutrition 33(9): 1975-1982. September 1980.

67. BUSINESS INTERNATIONAL CORPORATION [BIC]. International factfinding study: private sector marketing of contraceptives in eight developing countries. Vol. 1. New York, BIC, December 1978. 222 p.

68. BUTTFIELD, I.H. and HETZEL, B.S. Endemic goitre in Eastern New Guinea, with special reference to the use of iodized oil in prophylaxis and treatment. Bulletin of the World Health Organization 36(2): 243-262. 1967.

69. CABRERA, L., PINEDA, M.A., and ELKINS, H. Evaluation report on the APROFAM-FECOAR project. 1979. 36 p. (Unpublished)

70. CABRERA, B.D. and VALEZA, F. The reinfection rate of soil-transmitted helminths in the pilot areas after treatment: progress report. In: Asian Parasite Control Organization [APCO]. The Fourth Conference of the Asian Parasite Control Organization—the Integrated Family Planning Project—Tokyo, October 3-8, 1977: proceedings. Tokyo, APCO Secretariat, [1978]. p. 237-254.

71. CARLSON, B.D. and POTTS, M. The Community-Based Family Planning Services Family Planning Health and Hygiene (CBFPS/FPHH) Project. Washington, D.C., American Public Health Association, 1979. (Contract No. AID/pha/C-1100) 46 p.

•72. CASH, R.A. Oral rehydration for the treatment of diarrhea: its value as a health component in community based family planning distribution programs. Presented at the Workshop on Family Planning and Health Components in Community Based Distribution (CBD) Projects, Charlottesville, Virginia, January 12-14, 1982. 16 p.

73. CASH, R.A. Oral therapy for diarrhoea. Tropical Doctor 9(1): 25-30. January 1979.

74. CASH, R.A., NALIN, D.R., FORREST, J.N., and ABRUTYN, E. Rapid correction of acidosis and dehydration of cholera with oral electrolyte and glucose solution. Lancet 2(7672): 549-550. September 12, 1970.

•75. CERNADA, G.P. and HUANG, T. Training field workers for family planning. In: Cernada, G.P., ed. Taiwan family planning reader: how a program works. Taichung, Taiwan, Chinese Center for International Training in Family Planning, 1970. p. 45-63.

76. CHANDRAKAPURE, M.R. Padgha project: Maharashtra State, India. In: Sepulveda, C. and Mehta, N., eds. Community and health: an inquiry into primary health care in Asia. Bangkok, Thailand, United Nations Asian and Pacific Development Institute, 1980. (Technical Paper 34/BCS 4) p. 172-176.

77. CHAPRAS, S.D. Immunity in tuberculosis. Bulletin of the World Health Organization 60(4):447-462. 1982.

78. CHATTERJEE, A., MAHALANABIS, D., JALAN, K.N., MAITRA, T.K., AGARWAL, S.K., DUTTA, B., KHATUA, S.P., and BAGCHI, D.K. Oral rehydration in infantile diarrhoea: controlled trial of a low sodium glucose electrolyte solution. Archives of Disease in Childhood 53(4): 284-289. 1978.

79. CHEN, E.R., HSIEH, H.C., TSENG, P.T., and WANG, C.M. Progress report on research program: determination of the appropriate interval of medication for ascariasis control in Taiwan. In: Asian Parasite Control Organization [APCO]. The Seventh Asian Parasite Control/Family Planning Conference, Manila, Philippines, October 6-10, 1980: proceedings. Tokyo, APCO Secretariat, [1981]. p. 386-396.

80. CHEN, K.-H.M. The cost-effectiveness of a community-based social marketing project in Thailand: the Family Planning Health and Hygiene Project. Prepared for the International Workshop on Cost-effectiveness Analysis and Cost-benefit Analysis in Family Planning Programs, St. Michaels, Maryland, August 17-20, 1981. 15 p.

81. CHEN, L.C., BLACK, R.E., SARDER, A.M., MERSON, M.H., BHATIA, S., YUNUS, M.D., and CHAKRABORTY, J. Village-based distribution of oral rehydration therapy packets in Bangladesh. American Journal of Tropical Medicine and Hygiene 29(2): 285-290. March 1980.

82. CHEN, L.C., CHOWDHURY, A.K.M.A., and HUFFMAN, S.L. Anthropometric assessment of energy-protein malnutrition and subsequent risk of mortality among preschool aged children. American Journal of Clinical Nutrition 33(8): 1836-1845. August 1980.

83. CHEN, L.C., RAHMAN, M., and SARDER, A.M. Epidemiology and causes of death among children in a rural area of Bangladesh. International Journal of Epidemiology 9(1): 25-33. March 1980.

84. CHEN, P.-C. and KOLS, A. Population and birth planning in the Peoples' Republic of China. Population Reports, Series J, No. 25. Baltimore, Maryland, Johns Hopkins University, Population Information Program, January-February 1982. 44 p.

85. CISZEWSKI, R.L. [Population Services International] [Social marketing of ORS in Bangladesh] Personal communication, July 6, 1982.

86. CLEARY, T.G., CLEARY, H.R., DUPONT, H.L., EL-MALIH, G.S., KORDY, M.I., MOHIELDIN, M.S., SHOUKRY, I., SHUKRY, S., WYATT, R.C., and WOODWARD, W.E. The relationship of oral rehydration solution to hypernatremia in infantile diarrhea. Journal of Pediatrics 99(5): 739-741. November 1981.

87. CLEMENTS, M.L. Sudan community-based family health project: trip report, August 21-September 2, 1980. 19 p. (Unpublished, limited availability)

88. CLEMENTS, M.L., LEVINE, M.M., CLEAVES, F., HUGHES, T.P., CACERES, M., ALEMAN, E., BLACK, R.E., and RUST, J. Comparison of simple sugar/salt versus glucose/electrolyte oral rehydration solutions in infant diarrhoea. Journal of Tropical Medicine and Hygiene 84(5): 189-194. October 1981.

89. CLYDE, D.F. Chloroquine treatment for malaria in semi-immune patients. American Journal of Tropical Medicine and Hygiene 10: 1-6. 1961.

90. COLBOURNE, M.J. Prospects for malaria eradication with special reference to the Western Pacific. Transactions of the Royal Society of Tropical Medicine and Hygiene 56(3): 179-193. May 25, 1962.

91. COLE-KING, S. Health and development: anatomy of decision-making. In: Campbell, J.M., ed. International health: measuring progress. (Proceedings of the 1980 International Health Conference, Washington, D.C., June 11-13, 1980) Washington, D.C., National Council for International Health, 1980. p. 1-7.

92. COLLE, E., AYOUB, E., and RAILE, R. Hypertonic dehydration (hypernatremia): the role of feedings high in solutes. Pediatrics 2(1, Pt. 1): 5-12. July 1958.

•93 COLLE, R.D. Tasks required for technical management and supervision in rural health and development programs. In: Campbell, J.M., ed. The training and support of primary health care workers. (Proceedings of the 1981 International Health Conference, Washington, D.C., June 15-17, 1981) Washington, D.C., National Council for International Health, 1981. p. 175-184.

94. COOKE, T.M. Some thoughts about using open broadcasting to support village health workers. In: Campbell, J.M., ed. The training and support of primary health care workers. (Proceedings of the 1981 International Health Conference, Washington, D.C., June 15-17, 1981) Washington, D.C., National Council for International Health, 1981. p. 228-231.

95. COOMBS, P.H. The Lampang Health Development Project: Thailand's fresh approach to rural primary health care. Essex, Connecticut, International Council for Educational Development, 1979. (A Project to Help Practitioners Help the Rural Poor Case Study No. 7) 90 p.

96. ORNO, R.B. Trip report: Piaui and Pernambuco, Brazil. July 1982. 3 p. (Unpublished)

•97. CORREU AZCONA, S., ELU DE LEÑERO, M.d.C., CAMPOS CORDERO, J., and KELLER, A. Agent characteristics and productivity in the Mexican Rural Health Program. Studies in Family Planning 11(7-8): 247-254. July-August 1980.

98. CORZANTES, C.A. and DELGADO, R. Setting standards for monitoring the performance of primary care personnel—outreach workers. Journal of Ambulatory Care Management 3(2): 35-52. May 1980.

99. CREESE, A.L., SRIYABBAYA, N., CASABAL, G., and WISESO, G. Cost-effectiveness appraisal of immunization programs. Bulletin of the World Health Organization 60(4): 621-632. 1982.

100. CURLIN, M. [Center for Family Planning Activities] [Dacca concerned women's group field activities] Personal communication to Maria Wawer, May 1981.

101. DARLOW, B., VRBOVA, H., GIBNEY, S., JOLLEY, D., STACE, J., and ALPERS, M. Sulfadoxine-pyrimethamine for the treatment of acute malaria in children in Papua New Guinea. American Journal of Tropical Medicine and Hygiene 31(1): 1-13. January 1982.

102. DAWSON, C.R., HOSHIWARA, I., DAGHFOUS, T., MESSADI, M., VASTINE, D.W., and SCHACTER, J. Topical tetracycline and rifampicin therapy of endemic trachoma in Tunisia. American Journal of Ophthalmology 79(5): 803-811. May 1975.

•103. DE QUADROS, C.A. Immunization. Presented at the Workshop on Family Planning and Health Components in Community Based Distribution (CBD) Projects, Charlottesville, Virginia, January 12-14, 1982. 26 p.

•104. DE SHAY, S.L. Special problems in the supply of vaccines for control of communicable diseases. In: Campbell, J.M., ed. The training and support of primary health care workers. (Proceedings of the 1981 International Health Conference, Washington, D.C., June 15-17, 1981) Washington, D.C., National Council for International Health, 1981. p. 299-302.

105. DE SWEEMER, C., TEKULIA, H.S., UBEROI, I.S., KAKAR, D.N., SHARMA, K., MASIH, N., and TAYLOR, C.E. The challenge of interaction of nutrition and infection. Presented at the Nutrition Seminar of the University of Baroda, [Madhya Pradesh, India], February 15-22, 1970. 22 p.

106. DE SWEEMER, C. [Johns Hopkins School of Hygiene and Public Health] [Training of CBD workers] Personal communication to Maria Wawer, November 1981.

107. DEODHAR, N.S., COYAJI, B., GRANT, J., BOWLES, N., TEJADA, D., TAYLOR, C., OSMAN, Y., and KESSLER, S. Congress recommendations for the further implementation of primary health care. In: Brems, S. Message from Calcutta: highlights of the 3rd International Congress of the World Federation of Public Health Associations [WFPHA] and the 25th Annual Conference of the Indian Public Health Association. (Primary Health Care: World Strategy, Calcutta, India, February 23-26, 1981) Washington, D.C., WFPHA Secretariat, 1982. p. 1-5.

108. DWIVEDI, S.R., SAHU, H., PATTANAYAK, S., and ROY, R.G. Presumptive treatment of *P. vivax* malaria in Uttar Pradesh, Punjab, Haryana, Himachal Pradesh, Jammu and Kashmir. Indian Journal of Medical Research 70(Suppl.): 54-56. December 1979.

109. ECHEVERRY, G. Progress report: the integrated program in Colombia. In: Asian Parasite Control Organization [APCO]. The Fifth Conference of the Asian Parasite Control Organization—the Integrated Family Planning Project—Jakarta, November 6-10, 1978: proceedings. Tokyo, APCO Secretariat, [1979]. p. 225-233.

110. ECOMA, E.E. and WEISS, E. The Calabar rural MCH/FP project, 1975-1979. In: Atkins, B.S. Maternal and Child Health/Family Planning Program Technical Workshop, New York, October 31-November 2, 1979: proceedings. New York, Population Council, June 1980. p. 28-73.

111. EKANEM, O.J. and BONMARCHAND, M. Tolerance and haematological findings with antimalarials (chloroquine and Fansidar [pyrimethamine plus sulfadoxine]) in adults and children during field trials in Nigeria. Acta Tropica 37(3): 249-252. 1980.

•112. EL TOM, R. The Sudan Community Based Health and Family Planning Project: description of a training course. June 14, 1982, 10 p. (Unpublished)

113. ELLERBROCK, T.V. Oral replacement therapy in rural Bangladesh with home ingredients. Tropical Doctor 11(4): 179-183. October 1981.

114. FAMILY NUTRITION IMPROVEMENT PROGRAM [UPGK]. Buku pedoman petugas lapangan UPGK. [Handbook for UPGK fieldworkers] [IND] [Jakarta, Indonesia,] Ministries of Health, Religion, and Agriculture, National Family Planning Coordinating Board, and UNICEF, 1979. 85 p.

115. FAMILY PLANNING SOCIAL MARKETING PROJECT. Interim test marketing report of safe delivery kits (SDK). 1982. 3 p. (Unpublished)

116. FARID, Z., BASSILY, S., LEHMAN, J.S., Jr., KENT, D.C., HAXTON, J., PATWARDHAN, V.N., and HASSAN, A. Iron loss and reabsorption in *Ancylostoma duodenale* infection and bilharzial colonic polyposis. Transactions of the Royal Society of Tropical Medicine and Hygiene 64(6): 881-884. 1970.

117. FEFERBAUM, S. The tri-coloured strip and other health instruments. IDRC Reports 7(1): 8-10. March 1978.

•118. FINBERG, L., MAHALANABIS, D., and NALIN, D. Oral therapy for dehydration in acute diarrhoeal diseases with special reference to the global Diarrhoeal Diseases Control Programme. [Geneva] World Health Organization, Diarrhoeal Diseases Control Programme, 1979. (BAC/DDC/79.1) 6 p.

119. FINCH, C.A. Drugs effective in iron-deficiency and other hypochromic anemias. In: Gilman, A.G., Goodman, L.S., and Gilman, A., eds. Goodman and Gilman's the pharmacological basis of therapeutics. New York, Macmillan, 1980. p. 1315-1330.

120. FOEGE, W.H. Assessment of effectiveness, safety, and accessibility of available agents. B. Accessibility of vaccines. In: Institute of Medicine. Division of International Health. Pharmaceuticals for developing countries: conference proceedings. [Washington, D.C., January 29-31, 1979]. Washington, D.C., National Academy of Sciences, 1979. (Publication No. IOM-79-001) p. 83-94.

121. FOGH, S., JEPSEN, S., EFTERSØE, P., KEAN, B.H., MARR, J., DUBOSE, P., MCCROAN, J., CENTERS FOR DISEASE CONTROL [CDC]. BUREAU OF TROPICAL DISEASES. VECTOR BIOLOGY AND CONTROL DIVISION, and CDC. BUREAU OF EPIDEMIOLOGY. PARASITIC DISEASES DIVISION. Chloroquine-resistant malaria acquired in Kenya and Tanzania—Denmark, Georgia, New York. Morbidity and Mortality Weekly Report 27(47): 463-464. November 24, 1978.

•122. FOREIT, J.R., GOROSH, M.E., GILLESPIE, D.G., and MERRITT, C.G. Community-based and commercial contraceptive distribution: an inventory and appraisal. Population Reports, Series J, No. 19. Baltimore, Johns Hopkins University, Population Information Program, March 1978. 30 p.

123. FOSTER, S.O. [US Centers for Disease Control] [Oral rehydration therapy] Personal communication, August 20, 1982.

124. FRANÇOIS, J., DE ROUCK, A., CAMBIE, E., and DE LAEY, J.J. Retinopathie chloroquinique. [Chloroquine retinopathy.] [FRE] Ophthalmologica 165(2): 81-99. 1972.

125. FREIJ, L., MEEUWISSE, G.W., BERG, N.O., WALL, S., and GEBRE-MEDHIN, M. Ascariasis and malnutrition: a study in urban Ethiopian children. American Journal of Clinical Nutrition 32(7): 1545-1553. July 1979.

126. FUENTES, C. The Boyaca (Colombia) integrated program. In: Japanese Organization for International Cooperation in Family Planning [JOICFP]. First American Conference on Integrated Programs (CAPRI I), Bogotá, Colombia, August 11-14, 1980: proceedings. [Tokyo, JOICFP, 1981.] p. 105-119.

127. GARNIER, J.C. Morocco: training and utilization of family planning field workers. Studies in Family Planning 1(47): 1-5. November 1969.

128. GATENBY, P.B.B. and LILLIE, E.W. Clinical analysis of 100 cases of severe megaloblastic anaemia of pregnancy. British Medical Journal 2(5205): 1111-1114. October 15, 1960.

129. GERBER, M.S. Selection of primary health care workers in East Africa: a comparative study. In: Campbell, J.M., ed. The training and support of primary health care workers. (Proceedings of the 1981 International Health Conference, Washington, D.C., June 15-17, 1981) Washington, D.C., National Council for International Health, 1981. p. 27-32.

130. GHANA. UNIVERSITY OF GHANA MEDICAL SCHOOL. DEPARTMENT OF COMMUNITY HEALTH and UNIVERSITY OF CALIFORNIA, LOS ANGELES. DIVISION OF POPULATION, FAMILY AND INTERNATIONAL HEALTH. The Danfa Comprehensive Rural Health and Family Planning Project, Ghana: final report. Accra, University of Ghana Medical School and Los Angeles, University of California, September 30, 1979. (Contract No. AID/cm/afr-IDA-73-14) 970 p.

•131. GILLESPIE, D.G. Issues in integrated family planning and health programs. Presented at the Workshop on Family Planning and Health Components in Community Based Distribution (CBD) Projects, Charlottesville, Virginia, January 12-14, 1982. 26 p.

132. GILLESPIE, D.G., MAMLOUK, M.E., and CHEN, K.-H.M. Cost-effectiveness of family planning: overview of the literature. Presented at the International Workshop on Cost-effectiveness Analysis and Cost-benefit Analysis in Family Planning Programs, St. Michaels, Maryland, August 17-20, 1981. 34 p.

133. GILLESPIE, D.G. and MERRITT, C.G. Operations research on household and village contraceptive distribution systems. In: Gardner, J.S., Mertaugh, M.T., Micklin, M., and Duncan, G.W., eds. Village and household availability of contraceptives: Africa/West Asia. Seattle, Washington, Battelle Memorial Institute, 1977. p. 113-132.

134. GOLDEN, A.S. Integrated system for nutrition and primary health care. March, 1980. 16 p. (Unpublished)

•135. GOLDEN, A.S. and WAWER, M. Training village workers for family planning and health interventions. Presented at the Workshop on Family Planning and Health Components in Community Based Distribution (CBD) Projects, Charlottesville, Virginia, January 12-14, 1982. 21 p.

136. GOMEZ, A. [PROFAMILIA Colombia] [PROFAMILIA distribution of antihelminthics; Tolima State program] Personal communication, September 30, 1982.

137. GOMEZ, F. Community based distribution: the case of Colombia. Presented at the Workshop on Family Planning and Health Components in Community Based Distribution (CBD) Projects, Charlottesville, Virginia, January 12-14, 1982. 16 p.

•138. GOROSH, M.E., WISHIK, S.M., RODRIGUES, W., and ARRUDA, J.M. Evaluating community based distribution (CBD) programs. Presented at the 104th Annual Meeting of the American Public Health Association, Miami Beach, Florida, October 17-21, 1976. 20 p.

139. GRANT, R.Y., MAILLOUX, L., MILLS, R., SWEZY, F.C., and VAN DER VLUGT, T. An evaluation of AID-financed health and family planning projects in Nepal. Washington, D.C., American Public Health Association, January 26-March 26, 1980. 169 p.

140. GROSSE, R.N. Interrelation between health and population: observations derived from field experiences. Social Science and Medicine 14C: 99-120. 1980.

141. GUHA, A.K., ROY, J.R., DAS, S., ROY, R.G., and PATTANAYAK, S. Results of chloroquine sensitivity tests in *Plasmodium falciparum* in Orissa State. Indian Journal of Medical Research 70(Suppl.): 40-47. December 1979.

142. GUNASEKERA, L. Keynote speech on community participation. In: Brems, S. Message from Calcutta: highlights of the 3rd International Congress of the World Federation of Public Health Associations [WFPHA] and the 25th Annual Conference of the Indian Public Health Association (Primary Health Care: World Strategy, Calcutta, India, February 23-26, 1981). Washington, D.C., WFPHA Secretariat, 1982. p. 127-133.

143. GUPTA, M.C., MITHAL, S., ARORA, K.L., and TANDON, B.N. Effect of periodic deworming on nutritional status of ascaris-infested preschool children receiving supplementary food. Lancet 2(8029): 108-110. July 16, 1977.

144. GUZMÁN, M.A., SCRIMSHAW, N.S., BRUCH, H.A., and GORDON, J.E. Nutrition and infection field study in Guatemalan villages, 1959-1964: 7. Physical growth and development of preschool children. Archives of Environmental Health 17: 107-118. July 1968.

•145. GWATKIN, D.R., WILCOX, J.R., and WRAY, J.D. Can health and nutrition interventions make a difference? Overseas Development Council, Monograph No. 13, February 1980. 75 p.

146. GWATKIN, D.R., WILCOX, J.R., and WRAY, J.D. The policy implications of field experiments in primary health and nutrition care. Social Science and Medicine 14C(2): 121-128. June 1980.

147. HAMILTON, S., POPKIN, B.M., and SPICER, D. Nutrition of women of child bearing age in low income countries: significance, patterns, and determinants. Chapel Hill, North Carolina, Carolina Population Center, June 10, 1981. 44 p.

148. HARLAND, P.S.E.G., COX, D.L., LYEW, M., and LINDO, F. Composition of oral solutions prepared by Jamaican mothers for treatment of diarrhoea. Lancet 1(8220): 600-601. March 14, 1981.

149. HARPER, P. Family planning by couples in rural settings. February 6, 1980. 10 p. (Unpublished)

150. HARPER, P. Master summary: Household Distribution Project in Haiti. February 15, 1980. 17 p. (Unpublished)

151. HEIBY, J.R. [United States Agency for International Development] [Description of Community Based Health and Family Planning Project, Sudan] Personal communication, October 7, 1982.

*152. HEIBY, J.R. Low-cost health delivery systems: lessons from Nicaragua. American Journal of Public Health 71(5): 514-519. May 1981.

153. HEIBY, J. A training program for traditional birth attendants in Nicaragua. In: Campbell, J.M., ed. The training and support of primary health care workers. (Proceedings of the 1981 International Health Conference, Washington, D.C., June 15-17, 1981) Washington, D.C., National Council for International Health, 1981. p. 81-84.

154. HEIBY, J.R. Trip report, Indonesia, February 1-17, 1980. April 16, 1980. 15 p. (Unpublished, limited availability)

155. HEIBY, J.R. Trip report: Nigeria, September 22-October 6, 1978. October 23, 1978. 12 p. (Unpublished, limited availability)

156. HEIBY, J.R. and MONTEITH, R.S. Resource support services report: Nicaragua, March 21-April 3, 1976. June 14, 1976. (Unpublished, limited availability)

157. HEIBY, J.R. and MONTEITH, R.S. Resource support services report: year-end evaluation of the project. Community-Based Distribution of Contraceptives and Selected Health Supplies, Nicaragua, December 5-14, 1977. [Memorandum] Washington, D.C., U.S. Department of Health, Education and Welfare, Public Health Service, Center for Disease Control, January 20, 1978. 41 p. (Unpublished)

158. HELFENBEIN, S. and ERICSSON, S. Training of health professionals to be supervisors of primary health care workers. In: Campbell, J.M., ed. The training and support of primary health care workers. (Proceedings of the 1981 International Health Conference, Washington, D.C., June 15-17, 1981) Washington, D.C., National Council for International Health, 1981. p. 207-211.

159. HENDERSON, R.H. The challenge of EPI. World Health, February-March 1979. p. 32-35.

*160. HENDRATA, L. and ROHDE, J.E. Oral rehydration: where do we go from here? In: Jelliffe, D.B. and Jelliffe, E.F., eds. Advances in international maternal and child health. Vol. 1. Oxford, England, Oxford University Press, 1981. p. 98-104.

161. HERCBERG, S. and ROUAUD, C. Nutritional anaemia. Children in the Tropics, No. 133, 1981. 40 p.

162. HIRSCHHORN, N., CASH, R.A., WOODWARD, W.E., and SPIVEY, G.H. Oral fluid therapy of Apache children with acute infectious diarrhoea. Lancet 2(7766): 15-18. July 1, 1972.

*163. HOEY, J.M., ARYAL, S., and THAPA, R. Building the supervision system: experiences from Nepal. In: Campbell, J.M., ed. The training and support of primary health care workers. (Proceedings of the 1981 International Health Conference, Washington, D.C., June 15-17, 1981) Washington, D.C., National Council for International Health, 1981. p. 195-200.

164. HOPKINS, M. A test market design for the introduction of oral rehydration salts in Bangladesh. [Dacca, Population Services International], March 30, 1981. 22 p.

165. HUBER, D.H. and BANU, S. A practical assessment of instructions for oral rehydration therapy. [Abstract] Presented at the National Workshop on Oral Rehydration, International Centre for Diarrhoeal Disease Research, Bangladesh, September 26-28, 1979. 4 p.

166. HUDSON, H.E. The use of telecommunications in the training and support of primary health care workers. In: Campbell, J.M., ed. The training and support of primary health care workers. (Proceedings of the 1981 International Health Conference, Washington, D.C., June 15-17, 1981) Washington, D.C., National Council for International Health, 1981. p. 236-239.

*167. HUFFMAN, S. Nutrition activities in community based projects. July 14, 1982. 49 p. (Unpublished)

168. HUNTER, G.W., 3rd, SWARTZWELDER, J.C., and CLYDE, D.F. Intestinal nematodes. In: Tropical Medicine. 5th ed. Philadelphia, W.B. Saunders, 1976. p. 454-490.

169. HURWITZ, E.S., JOHNSON, D., and CAMPBELL, C.C. Resistance of plasmodium falciparum malaria to sulfadoxine-pyrimethamine ('Fansidar') in a refugee camp in Thailand. Lancet 1(8228): 1068-1070. May 9, 1981.

170. IFEKWUNIGWE, A. Health and nutrition in urban areas. In: Mayer, J. and Dwyer, J.T., eds. Food and nutrition policy in a changing world. New York, Oxford University Press, 1979. p. 138-151.

171. INTERNATIONAL PLANNED PARENTHOOD FEDERATION [IPPF]. Community family planning services in IPPF. London, IPPF, December 1981. 24 p.

172. INTERNATIONAL PLANNED PARENTHOOD FEDERATION. CBD ADVISORY COMMITTEE. Project evaluation report on inner ring projects: Sri Lanka, Thailand, Korea. July 26, 1976. 46 p. (Unpublished)

173. INTERNATIONAL PLANNED PARENTHOOD FEDERATION [IPPF]. WESTERN HEMISPHERE REGION. New acceptors for each program in the region: 1977-1981 [Tables]. New York, IPPF, [1982]. 6 p.

174. INTERNATIONAL STUDY GROUP. Beneficial effects of oral electrolyte-sugar solutions in the treatment of children's diarrhoea. Pt. 2: studies in seven rural villages. Journal of Tropical Pediatrics 27(3): 136-139. June 1981.

175. ISAACS, S. Major consideration in planning community-based distribution. UNFPA Newsletter 4(1): 4. January 1981.

176. ISLAM, M.R., GREENOUGH, W.B., 3rd, RAHMAN, M.M., CHOUDHURY, A.K.A., and SACK, D.A. Lobon-gur (common salt and brown sugar) oral rehydration solution in the diarrhoea of adults. Dacca, International Centre for Diarrhoeal Disease Research, Bangladesh, April 1980. (Scientific Report No. 36) 17 p.

177. ISMID, I.S., MARGONO, S.S., ANGGARINI, S., MAHRUDIN, H., RASAD, R., RASIDI, R., and RUKMONO, B. The effect of mass treatment in different target-groups on the dispersion of ascaris eggs in soil (Indonesia). In: Asian Parasite Control Organization [APCO]. The Eighth Asian Parasite Control/Family Planning Conference, Bangkok, October 19-24, 1981: proceedings. Tokyo, APCO Secretariat, [1982]. p. 202-204.

178. IYENGAR, L. and RAJALAKSHMI, K. Effect of folic acid supplement on birth weights of infants. American Journal of Obstetrics and Gynecology 122(3): 332-336. June 1, 1975.

179. JACKSON, R.T. and LATHAM, M.C. Anemia of pregnancy in Liberia, West Africa: a therapeutic trial. American Journal of Clinical Nutrition 35(4): 710-714. April 1982.

*180. JAPANESE ORGANIZATION FOR INTERNATIONAL COOPERATION [JOICFP]. Brief guidelines for designing an integrated family planning and parasite control project. Tokyo, JOICFP, 1981. 41 p.

181. JELLIFFE, D.B. The assessment of the nutritional status of the community. Geneva, World Health Organization, 1966. 271 p.

182. JENSEN, J. Protein-calorie malnutrition and industrially processed weaning foods. In: Mayer, J. and Dwyer, J.T., eds. Food and nutrition policy in a changing world. New York, Oxford University Press, 1979. p. 223-240.

183. JOHN, P. Report for the year 1979-80. Deenabandupuram, India, Management Committee of Deenabandu Rural Life Centre, September 1980. 13 p. (Mimeo)

184. JOHNSTON, B.F. and MEYER, A.J. Nutrition, health, and population in strategies for rural development. Economic Development and Cultural Change 26(1): 1-23. October 1977.

185. KAN-CHUA, S.P. The efficacy of mebendazole in a single dose for mass chemotherapy of mixed *Trichuris infections*. In: Asian Parasite Control Organization [APCO]. The Seventh Asian Parasite Control/Family Planning Conference, Manila, Philippines, October 6-10, 1980: proceedings. Tokyo, APCO Secretariat, [1981]. p. 359-367.

186. KANAGARATNAM, K. and PIERCE, C.S. Population policy and family planning programs: trends in policy and administration. Washington, D.C., World Bank, 1980. (World Bank Staff Working Paper No. 411) 23 p.

187. KANTNER, J. Mexico: new strategies for delivery of MCH and FP services. April 14, 1980. 9 p. (Unpublished)

188. KAPIL, I. Integrated population activities. [Working paper] [Paris], Organisation for Economic Co-operation and Development, Development Centre, 1979. (CD/R(79)21) 16 p.

189. KARUNAKARAN, C.S. A clinical trial of malaria prophylaxis using a single dose of chloroquine at different intervals in an endemic malarious area. Journal of Tropical Medicine and Hygiene 83: 195-201. 1980.

*190. KEUSCH, G.T. Antihelminthic therapy in community based family planning and health projects. Presented at the Workshop on Family Planning and Health Components in Community Based Distribution (CBD) Projects, Charlottesville, Virginia, January 12-14, 1982. 20 p.

191. KEUSCH, G.T. Homing in on interventions in the malnutrition-infection complex. American Journal of Clinical Nutrition 33(4): 727-729. April 1980.

192. KHOO, K.-K. The treatment of malaria in glucose-6-phosphate dehydrogenase deficient patients in Sabah. Annals of Tropical Medicine and Parasitology 75(6): 591-595. December 1981.

*193. KIELMANN, A.A., AIELLO, C.A., and KIELMANN, N.S. Nutrition intervention: an evaluation of six studies. Studies in Family Planning 13(8-9): 246-257. August-September 1982.

*194. KIELMANN, A.A., DE SWEEMER, C., PARKER, R.L., and TAYLOR, C.E. Analysis of morbidity and mortality. In: Taylor, C.E., Kielmann, A.A., De Sweemer, C., Parker, R.L., Chernichovsky, D., Uberoi, I.S., Masih, N., Kakar, D.N., Sarma, R.S., and Reinke, W.A., eds. Malnutrition, infection, growth and development: the Narangwal experience. [Washington, D.C.], World Bank, [1980]. 37 p.

*195. KIELMANN, A.A. and MCCORD, C. Home treatment of childhood diarrhea in Punjab villages. Environmental Child Health 23(4): 197-201. August 1977.

196. KIM, T.I., ROSS, J.A., and WORTH, G.C. Training. In: Kim, T.I., Ross, J.A., and Worth, G.C. The Korean National Family Planning Program. New York, Population Council, 1972. p. 100-122.

*197. KING, M., KING, F., and MARTODIPOERO, S. Primary child care: a manual for health workers. Oxford, England, Oxford University Press, 1978. 315 p.

198. KOBLINSKY, M.A. Severe measles and measles blindness. 1982. 65 p. (Unpublished)

199. KUNII, C. Dawn of humanistic family planning in Asia: personal findings and impressions of the Study Team on the Integrated Family Planning Nutrition and Parasite Control Program. Tokyo, Japanese Organization for International Cooperation in Family Planning, [1979]. 29 p.

200. KUNII, C. Philosophical background for humanistic family planning. In: Regional Organization for Inter-Governmental Cooperation and Coordination in Population and Family Planning in South East Asia [IGCC]. Workshop/Seminar for More Effective Promotion and Management of Integrated Projects (Family Planning, Parasite Control and Nutrition). (A report on the Joint IGCC/JOICFP/BKKBN Workshop/Seminar, Jakarta, Indonesia, February 19-23, 1980) Kuala Lumpur, Malaysia, IGCC Secretariat, 1980. p. 136-139.

*201. KUSNECOV, R., STOREY, J., and LIETAERT, P. Effect of four different types of single-dose treatment with chloroquine and with chloroquine and pyrimethamine on *Plasmodium falciparum* infections in a semi-immune population in northern Nigeria. Bulletin of the World Health Organization 46: 117-122. 1972.

202. LADIPO, O.A., WEISS, E.M., DELANO, G.E., and REVSON, J. Community-based delivery (CBD) of low-cost family planning and maternal and child health services in rural Nigeria. Presented at the Workshop on Family Planning and Health Components in Community Based Distribution (CBD) Projects, Charlottesville, Virginia, January 12-14, 1982. 10 p.

203. LALL, S. Problems of distribution, availability, and utilization of agents in developing countries. C. Problems of distribution, availability and utilization of agents in developing countries: an Asian perspective. In: Institute of Medicine. Division of International Health. Pharmaceuticals for developing countries: conference proceedings. (Washington, D.C., January 29-31, 1979) Washington, D.C., National Academy of Sciences, 1979. (Publication No. IOM-79-001) p. 236-249.

204. LAMPTEY, P.R., NICHOLAS, D.D., and QUARTEY-PAPAFIO, E. Training village health workers in rural Ghana. World Health Forum 1(1-2): 52-56. 1981.

205. LAURO, D. Sudan Community Based Family Health Project: trip report, August 15-September 4, [1980]. 22 p. (Unpublished, limited availability)

206. LAURO, D. [Center for Population and Family Health, Columbia University] [Sudan Community Based Health and Family Planning Project information] Personal communication to Maria Wawer, March 1981.

207. LAYRISSE, M., APARCEDO, L., MARTÍNEZ-TORRES, C., and ROCHE, M. Blood loss due to infection with *Trichuris trichiura*. American Journal of Tropical Medicine and Hygiene 16(5): 613-619. 1967.

208. LECHTIG, A., HABICHT, J.-P., DELGADO, H., KLEIN, R.E., YARBROUGH, C., and MARTORELL, R. Effect of food supplementation during pregnancy on birthweight. Pediatrics 56(4): 508-520. October 1975.

209. LECHTIG, A., MARTORELL, R., DELGADO, H., YARBROUGH, C., and KLEIN, R.E. Food supplementation during pregnancy, maternal anthropometry and birth weight in a Guatemalan rural population. Tropical Pediatrics and Environment Child Health 24(5): 217-222. October 1978.

210. LECHTIG, A., YARBROUGH, C., DELGADO, H., HABICHT, J.-P., MARTORELL, R., and KLEIN, R.E. Influence of maternal nutrition on birth weight. American Journal of Clinical Nutrition 28(11): 1223-1233. November 1975.

211. LECOMTE, J., LABBOK, M., and FRIEDMAN, J. An evaluation of the population and family planning support project in Morocco. Washington, D.C., American Public Health Association, 1982. (Contract No. AID/DSPE-C-0053) 104 p.

212. LEITZMANN, C. Nutrition in developing countries. (Report of a meeting, Limuru, Kenya, December 5-13, 1977) American Journal of Clinical Nutrition 32(6): 1350-1352. June 1979.

*213. LEVINE, M.M., CLEMENTS, M.L., BLACK, R.E., HUGHES, T.P., BLUM, D., ANDINO, R., and CORRALES, G. A practical, reliable method for preparing simple sugar/salt oral rehydration solution. Journal of Tropical Medicine and Hygiene 84(2): 73-76. April 1981.

214. LLEWELLYN-JONES, D. Severe anaemia in pregnancy (as seen in Kuala Lumpur, Malaysia). Australian and New Zealand Journal of Obstetrics and Gynaecology 5(4): 191-197. November 1965.

215. LLOYD, J.S. Improving the cold chain for vaccines. WHO Chronicle 31(1): 13-18. January 1977.

216. LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE. ROSS INSTITUTE. Malaria prevention in travellers from the United Kingdom: report of meetings convened by the Ross Institute. British Medical Journal 283(6285): 214-218. July 18, 1981.

217. MAGUIRE, E. S. The two-edged scimitar: integration issues for family planning and health in Tunisia. Presented at the Workshop on Family Planning and Health Components in Community Based Distribution (CBD) Projects, Charlottesville, Virginia, January 12-14, 1982. 33 p.

218. MAHALANABIS, D., JALAN, K.N., CHATTERJEE, A., MAITRA, T.K., and AGARWAL, S.K. Present and future of oral rehydration therapy for diarrheal diseases with special reference to health care delivery. Indian Journal of Preventative and Social Medicine 6(4): 286-290. December 1975.

219. MAHONEY, J.L. Malaria 'breakthroughs' and resistance to chloroquine in Africa. South African Medical Journal 60(20): 786-788. November 14, 1981.

220. MANDEL, H.G. and COHN, V.H. Fat-soluble vitamins: vitamins A, K, and E. In: Gilman, A. G., Goodman, L.S., and Gilman, A., eds. Goodman and Gilman's the pharmacological basis of therapeutics. New York, Macmillan, 1980. p. 1583-1601.

221. MANGANI, N. [PRODEF CBD Family Planning and Health Project] [PRODEF project information] Personal communication, April 1981.

222. MANOFF, R.K., COOKE, T.M., and ROMWEBER, S.T. Radio, advertising techniques, and nutrition education: a summary of a field experiment in the Philippines and Nicaragua: final report. New York, Manoff International, Inc., December 1977. (Contract No. AID/ta-C-1133) 104 p.

223. MAQSUDUR RAHMAN, K.M. Study of *Plasmodium falciparum* resistance to 4-aminoquinolines (chloroquine) in Sabah, Malaysia. Journal of Tropical Medicine and Hygiene 83: 259-264. 1980.

224. MARFIL, M.P. Sarikaya: toward community self-reliance in health and family planning. Initiatives in Population 5(3): 20-23. 1979.

225. MARTINEZ-TORRES, C., OJEDA, A., ROCHE, M., and LAYRISSE, M. Hookworm infection and intestinal blood loss. Transactions of the Royal Society of Tropical Medicine and Hygiene 61(3): 373-383. 1967.

226. MARTORELL, R., HABICHT, J.-P., YARBROUGH, C., LECHTIG, A., KLEIN, R.E., and WESTERN, K.A. Acute morbidity and physical growth in rural Guatemalan children. American Journal of Diseases of Children 129(11): 1296-1301. November 1975.

227. MASSEY, J.A. Rural health aide training in El Salvador. Washington, D.C., American Public Health Association, 1976. (Contract No. AID/pha/C-1100) 97 p.

228. MATOVINOVIC, J. Complications of goiter prophylaxis. In: Stanbury, J.B. and Hetzel, B.S., eds. Endemic goiter and endemic cretinism: iodine nutrition in health and disease. New York, John Wiley & Sons, 1980. p. 533-549.

*229. MCCORD, C. Evaluation of Menoufia, Egypt, oral rehydration project. Washington, D.C., American Public Health Association, 1980. (Contract No. AID/DSPE-C-1100) 62 p.

230. MCCORD, C. and KIELMANN, A.A. A successful programme for medical auxiliaries treating childhood diarrhoea and pneumonia. Tropical Doctor 8(4): 220-225. October 1978.

231. MECHANIC, D. The comparative study of health care delivery systems. Annual Review of Sociology 1: 43-65. 1975.

232. MENNONITE CENTRAL COMMITTEE. Family planning program Bangladesh. Dacca, Bangladesh, Mennonite Central Committee, 1979. (Report No. 4) 71 p.

233. MERRITT, C.G. A.I.D.-funded operations research in family planning delivery: an interim overview. March 1980. 16 p. (Unpublished)

234. MERRITT, C.G. Expanding availability of modern contraceptives to traditional rural peoples in Latin America: can *partéras empiricas* provide community distribution? [Memorandum] [Washington, D.C.], USAID, June 29, 1976. (Nicaragua/AID/MOH-FP/#3) 10 p. (Unpublished, limited availability)

235. MERRITT, G., GILLISPIE, D., MAGUIRE, E., HEIBY, J., LABBOK, M., MUTCHLER, D., and SHELTON, J. Experimental family planning programs: improving prevalence of contraceptive use. Presented at the Annual Meeting of the Population Association of America, Philadelphia, April 26-28, 1979. 29 p.

236. MERSON, M. [World Health Organization] [Cost of ORT packets] Personal communication, September 13, 1982. 2 p.

237. METGE, P., RODOR, F., CHOVET, M., MONTABONE, M., and LLAVADOR, M. A propos de 6 cas de rétinopathie chloro-

quinique consécutive a une prophylaxie antipalustré. [Six cases of chloroquine-induced retinopathy following malaria prophylaxis.] [FRE] Thérapie 35(3): 439-442. May-june 1980.

*238. MICKLIN, M. Contraceptive distribution and family planning at community and household levels: institutional barriers and evaluation strategies. [1978]. 18 p. (Unpublished)

239. MIDDLETON, J. and QUAH, J.S.T. Training management in family planning programs. Kuala Lumpur, Malaysia, Asian and Pacific Development Administration Centre, 1978. (Family Planning Programme Management Module Series No. 5) 178 p.

240. MILLER, R.I. Cost/benefit and the community health worker. In: Campbell, J.M., ed. International health: measuring progress. (Proceedings of the 1980 International Health Conference, Washington, D.C., June 11-13, 1980) Washington, D.C., National Council for International Health, 1980. p. 84-86.

241. MOBARAK, A.B., HAMMAMY, M.T., GOMAA, A.I., ABOU-EL-SAAD, S., LOTFI, R.K., and MAZEN, I. Diarrheal disease control study May through October 1980. [Cairo], Egypt, Ministry of Health, Rural Health Dept., Strengthening Rural Health Delivery Project, [1980]. 51 p.

242. MOENGINAH, P.A., SUPRAPTO, SOENARTO, J., BACHTIN, M., SUTRISNO, D., SUTARYO, and ROHDE, J.E. Oral sucrose therapy for diarrhoea. [Letter] Lancet 2(7929): 323. August 16, 1975.

243. MOHSENY, M.G. Experiences in recruitment of primary health care workers in various contexts. In: Campbell, J.M., ed. The training and support of primary health care workers. (Proceedings of the 1981 International Health Conference, Washington, D.C., June 15-17, 1981) Washington, D.C., National Council for International Health, 1981. p. 33-36.

244. MOLLA, A., MOLLA, A.M., RAHIM, A., SARKER, S.A., MOZAFFAR, Z., and RAHAMAN, M. Intake and absorption of nutrients in children with cholera and rotavirus infection during acute diarrhea and after recovery. Dacca, International Centre for Diarrhoeal Disease Research, Bangladesh, [1980]. 23 p.

245. MONDOT-BERNARD, J. Planning food supplies for an expanding population. In: Cassen, R., Wolfson, M., and Ohlin, G., eds. Planning for growing populations. Paris, Organisation for Economic Co-operation and Development, Development Centre, 1978. p. 49-78.

246. MONTALVAN, J.E. Primary health care program in Panama: an evaluation. In: Campbell, J.M., ed. International health: measuring progress. (Proceedings of the 1980 International Health Conference, Washington, D.C., June 11-13, 1980) Washington, D.C., National Council for International Health, 1980. p. 65-66.

247. MORAN, M. Oral rehydration therapy in home and hospital: experience in rural Nigeria. Pediatric Nursing 2(5): 32-33. October 1976.

*248. MORLEY, D. and WOODLAND, M. See how they grow: monitoring child growth for appropriate health care in developing countries. New York, Oxford University Press, 1979. 265 p.

249. MÜLLER, H.R. Can efficient food distribution help to improve the nutrition situation in the developing countries? Bibliotheca Nutritio et Dieta 28: 114-129. 1979.

250. MUNOZ, R. Adjustments in community based distribution systems in Colombia in order to integrate with parasite control activities. In: Regional Organization for Inter-Governmental Cooperation and Coordination in Population and Family Planning in South East Asia [IGCC]. Workshop/Seminar for More Effective Promotion and Management of Integrated Projects (Family Planning, Parasite Control and Nutrition). (A report on the Joint IGCC/JOICFP/BKKBN Workshop/Seminar, Jakarta, Indonesia, February 19-23, 1980) Kuala Lumpur, Malaysia, IGCC Secretariat, 1980. p. 114-118.

251. MUSGRAVE, I.A., HAWES, R.B., JAMESON, J.L., SLOANE, R.A., and QUAYLE, P.A. Mebendazole: evaluation of a new antihelminthic for trichuriasis, hookworm, and strongyloidiasis. Medical Journal of Australia 1(9): 403-405. May 5, 1979.

252. MUTTALIB, M.A., KHAN, M.U., and HAQ, J.A. Single dose regime of mebendazole in the treatment of polyparasitism in children. In: Asian Parasite Control Organization [APCO]. The Seventh Asian Parasite Control/Family Planning Conference, Manila, October 6-10, 1980: proceedings. Tokyo, APCO Secretariat, [1981]. p. 280-284.

253. MUTTALIB, M.A. and SUZUKI, N. Summary of Bangladesh research projects. [Abstract] In: Asian Parasite Control Organization [APCO]. The Eighth Asian Parasite Control/Family Planning Conference, Bangkok, October 19-24, 1981: proceedings. Tokyo, APCO Secretariat, [1982]. p. 199-201.

254. NALIN, D.R. and CASH, R.A. Oral or nasogastric maintenance therapy for diarrhoea of unknown aetiology resembling cholera. Transactions of the Royal Society of Tropical Medicine and Hygiene 64(5): 769-771. 1970.

255. NALIN, D.R., HARLAND, E., RAMLAL, A., SWABY, D., MCDONALD, J., GANGAROSA, R., LEVINE, M., AKIERMAN, A., ANTOINE, M., MACKENZIE, K., and JOHNSON, B. Comparison of low and high sodium and potassium content in oral rehydration solutions. Journal of Pediatrics 97(5): 848-853. November 1980.

256. NALIN, D.R. and HIRSCHHORN, N. Research on oral rehydration therapy for diarrhoeal dehydration. Presented at the World Health Organization Regional Planning Meeting on Diarrhoeal Diseases Control, Manila, Philippines, June 5-7, 1979. 9 p.

257. NATIONAL RESEARCH COUNCIL. COMMITTEE ON INTERNATIONAL NUTRITION PROGRAMS. Management of the diarrheal diseases at the community level. Washington, D.C., National Academy Press, 1981. (Contract No. AID/ta-C-1428) 22 p.

258. NATOO, S.M., DANDARE, M.P. and PARULKAR, V. Pilot project of comprehensive rural health primary health unit—Vadu. Pune, India, September 1978. 18 p. (Mimeo)

*259. NESS, G.D. On integration in family planning programming. In: United Nations Fund for Population Activities [UNFPA]. On integration of family planning with rural development. (A report on UNFPA/EWPI Technical Working Group Meeting on Integration of Family Planning with Rural Development, Honolulu, February 15-18, 1978) New York, UNFPA, 1979. (Policy Development Studies No. 1) p. 14-36.

260. NESS, G.D. The political economy of integration in development strategies: comment on Johnston and Meyer. Economic Development and Cultural Change 29(2): 401-405. January 1981.

261. NEUMANN, C.G., JELLIFFE, D.B., and JELLIFFE, E.F.P. Interaction of nutrition and infection: a factor important to African development. Clinical Pediatrics 17(11): 807-812. November 1978.

262. NOSSEIR, N. Comparative analysis of the ORS utilization surveys. [Draft] March 4, 1982. 37 p. (Unpublished)

263. NOSSEIR, N. [American University in Cairo] [Menoufia 2 project] Personal communication. July 13, 1982.

264. NOSSEIR, N. The short-term effects of an action program: Menoufia, Egypt. Presented at the Population Association of America Meeting, San Diego, California, April 29-May 1, 1982. 24 p.

*265. O'BYRNE, M., COLES, T.G., and LYONS, J.V. Training for competence and relevance. In: Smith, R.A., ed. Manpower and primary health care. Honolulu, University Press of Hawaii, 1978. p. 78-128.

266. O'CONNOR, R.W. Implementing a national rural health system: management experiences from Afghanistan—project summary. In: Managing health systems in developing areas: experiences from Afghanistan. Lexington, Massachusetts, Lexington Books, 1980. p. 151-158.

267. OLATUNDE, A. and OBIH, P.O. Use and misuse of 4-aminoquinoline antimalarials in tropical Africa and re-examination of itch reaction to these drugs. Tropical Doctor 11(3): 97-101. July 1981.

*268. OSBORN, R.W. and REINKE, W.A., eds. Community based distribution of contraception: a review of field experience. Baltimore, Johns Hopkins University, School of Hygiene and Public Health, January 1981. 230 p.

269. PALMER, D.L., KOSTER, F.T., ISLAM, A.F.M.R., RAHMAN, A.S.M.M., and SACK, R.B. Comparison of sucrose and glucose in the oral electrolyte therapy of cholera and other severe diarrheas. New England Journal of Medicine 297(20): 1107-1110. November 17, 1977.

*270. PAN AMERICAN HEALTH ORGANIZATION. Expanded program in immunization: handbook of operations. 1977. 332 p. (Unpublished)

271. PARADO, J.P. Botica sa barangay. Studies in Family Planning 10(6-7): 212-213. June-July 1979.

272. PARADO, J.P. Experiences in the Bohol MCH/FP Project. In: Atkins, B.S., ed. Maternal and Child Health/Family Planning Program Technical Workshop. New York, October 31-November 2, 1979: proceedings. New York, Population Council, June 1980. p. 86-99.

273. PARADO, J.P., WILLIAMSON, N.E., and MATURAN, E.G., eds. Final report of the Bohol project. March 1980. 272 p. (Unpublished)

274. PARKER, A. Health technology and primary health care. Medical Economics 12(1C-2C): 29-41. June 1978.

*275. PARKER, R.L. Selected health components of community-based distribution programs. Presented at the Workshop on Family Planning and Health Components in Community Based Distribution (CBD) Projects, Charlottesville, Virginia, January 12-14, 1982. 35 p.

*276. PARKER, R.L., RINEHART, W., PIOTROW, P.T., and DOUCETTE, L. Oral rehydration therapy (ORT) for childhood diarrhea. Population Reports, Series L, No. 2. Baltimore, Johns Hopkins University, Population Information Program, November-December 1980. 36 p.

*277. PARLATO, M.B. and FAVIN, M.N. Primary health care: progress and problems: an analysis of 52 AID-assisted projects. Washington, D.C., American Public Health Association, International Health Programs, August 1982. 101 p.

278. PARSONS, T. Societies: evolutionary and comparative perspectives. Englewood Cliffs, N.J., Prentice Hall, 1966.

279. PARTONO, F., PURNOMO and TANGKILISAN, A. The use of mebendazole in the treatment of polyparasitism. Southeast Asian Journal of Tropical Medicine and Public Health 5(2): 258-264. June 1974.

280. PEARLMAN, D.S. Medical emergencies due to allergic reactions. In: Kempe, C.H., Silver, H.K., and O'Brien, D. Current pediatric diagnosis & treatment. Los Altos, California, Lange Medical Publications, 1980. p. 928-929.

281. PEÑA, J. Mexico's integrated program. In: Japanese Organization for International Cooperation in Family Planning [JOICFP]. First American Conference on Integrated Programs (CAPRI I), Bogotá, Colombia, August 11-14, 1980: proceedings. [Tokyo, JOICFP, 1981]. p. 54-61.

282. PEÑA CHAVARRIA, A., SWARTZWELDER, J.C., VILLAREJOS, V.M., and ZELEDON, R. Mebendazole, an effective broad-spectrum anthelmintic. American Journal of Tropical Medicine and Hygiene 22(5): 592-595. 1973.

283. PETERS, W. Assessment of effectiveness, safety, and accessibility of available agents. A. Drugs against parasitic diseases. In: Institute of Medicine. Division of International Health. Pharmaceuticals for developing countries. (Conference proceedings, Washington, D.C., January 29-31, 1979) Washington, D.C., National Academy of Sciences, 1979. (Publication No. IOM-79-001) p. 59-82.

284. PHILLIPS, J.F. The demographic impact of two contraceptive service projects in Matlab Thana of Bangladesh. Presented at the Regional Seminar on Evaluation of Schemes and Strategies for Integrated Family Planning Programmes with Special Reference to Increased Involvement of Local Institutions, Bangkok, June 1981. 51 p.

285. PIERCE, N.F. and HIRSCHHORN, N. Oral fluid—a simple weapon against dehydration in diarrhoea: how it works and how to use it. WHO Chronicle 31(3): 87-93. March 1977.

286. PINES, J.M. Selecting process indicators: a participatory process. In: Campbell, J.M., ed. International health: measuring progress. (Proceedings of the 1980 International Health Conference, Washington, D.C., June 11-13, 1980) Washington, D.C., National Council for International Health, 1980. p. 57-58.

287. PIYARATNE, D.P. WHO's strategy for the development of primary health care in the western Pacific region. [Abstract] In: Brems, S., ed. Message from Calcutta: highlights of the 3rd International Congress of the World Federation of Public Health Associations [WFPHA] and the 25 Annual Conference of the Indian Public Health Association. (Primary Health Care: World Strategy, Calcutta, India, February 23-26, 1981) Washington, D.C., WFPHA Secretariat, 1982. p. 150.

288. PIZARRO, D., POSADA, G., MATA, L., NALIN, D., and MOHS, E. Oral rehydration of neonates with dehydrating diarrhoeas. Lancet 2(8154): 1209-1210. December 8, 1979.

289. PLATA, S. [PROFAMILIA Colombia] [Social marketing of non-contraceptive products by PROFAMILIA] Personal communication, July 14, 1982.

290. PLORDE, J.J. Malaria. In: Isselbacher, K.J., Adams, R.D., Braunwald, E., Petersdorf, R.G., and Wilson, J.D., eds. Harrison's principles of internal medicine. New York, McGraw-Hill, 1980. p. 867-873.

291. POPULATION COUNCIL. Household distribution project—Boyaca: second phase, August 1, 1980-October 31, 1981. 1980. 42 p. (Unpublished, limited availability)

292. POUDAYL, L. and THAPA, R. Diarrhoeal diseases research study: preliminary findings on feasibility of homemade oral rehydration solution. [1980]. 7 p. (Unpublished)

293. PRETELL, E., DEGROSSI, O., RICCDONA, G., STANBURY, J., and THILLY, C. The use of iodized oil. In: Dunn, J.T. and Medeiros-Neto, G.A., eds. Endemic goiter and cretinism: continuing threats to world health. (Report of the 4th Meeting of the PAHO Technical Group on Endemic Goiter held in Guarujá, São Paulo, Brazil, October 14-18, 1973) Washington, D.C., Pan American Health Organization, 1974. (Scientific Publication No. 292) p. 278-281.

294. PROGRAM FOR THE INTRODUCTION AND ADAPTATION OF CONTRACEPTIVE TECHNOLOGY [PIACT]. Instructional print materials for non-readers. Seattle, Washington, PIACT, November 1981. 4 p.

295. PROGRAMA INTEGRADO JOICFP PROFAMILIA COLOMBIA. Parásitos intestinales. [Intestinal parasites.] [SPA] Bogota, PROFAMILIA, [1979]. 10 p.

296. PUFFER, R.R. and SERRANO, C.V. Patterns of mortality in childhood: report of the Inter-American Investigation of Mortality in Childhood. Washington, D.C., Pan American Health Organization [PAHO], 1973. (PAHO Scientific Publication No. 262) 470 p.

297. RAHAMAN, M.M., AZIZ, K.M.S., PATUARI, Y., and MUNSHI, M.H. Diarrhoeal mortality in two Bangladesh villages with and without country-based oral rehydration therapy. Lancet 2(8147): 809-812. October 20, 1979.

*298. RAHMAN, M., CHEN, L.C., CHAKRABORTY, J., YUNUS, MD., FARUQUE, A.S.G., and CHOWDHURY, A.I. Use of tetanus toxoid for the prevention of neonatal tetanus. 2. Immunization acceptance among pregnant women in rural Bangladesh. Bulletin of the World Health Organization 60(2): 269-277. 1982.

299. RAHMAN, M. and D'SOUZA, S. A review of findings on the impact of health intervention programmes in two rural areas of Bangladesh. Dacca, International Centre for Diarrhoeal Disease Research, Bangladesh, November 1980. (Special Publication No. 11) 28 p.

300. RAMALINGASWAMI, V. and TANDON, B.N. Approaches to nutrition rehabilitation and supplementary feeding. In: Mayer, J. and Dwyer, J.T., eds. Food and nutrition policy in a changing world. New York, Oxford University Press, 1979. p. 127-137.

301. REINKE, W.A. The Danfa, Lampang, and Narangwal Projects: a comparative review. Presented at the Workshop on Family Planning and Health Components in Community Based Distribution (CBD) Projects, Charlottesville, Virginia, January 12-14, 1982. 14 p.

302. REINKE, W.A. Master summary: Sudan: community-based family health project. February 12, 1980. 15 p. (Unpublished)

303. RHOADS, C.P., CASTLE, W.B., PAYNE, G.C., and LAWSON, H.A. Observations on the etiology and treatment of anemia associated with hookworm infection in Puerto Rico. Medicine 13(1): 317-375. February 1934.

304. ROCHE, M. and LAYRISSE, M. Nature and causes of hookworm anemia. American Journal of Tropical Medicine and Hygiene 15(6, Pt. 2): 1032-1100. 1966.

305. RODRIGUES, W., FOREIT, J.R., ARRUDA, J.M., and MILARE, J. A comparison of the cost-effectiveness of different types of service delivery posts in the BEMFAM family planning program in Piaui State, Brazil. Presented at the International Workshop on Cost-effectiveness Analysis and Cost-benefit Analysis in Family Planning Programs, St. Michaels, Maryland, August 17-20, 1981. 27 p.

306. RODRIGUES, W., VALLADÃO, C., and FOREIT, J.R. Review of existing and proposed integrated projects in Piaui State, Brazil. Presented at the Workshop on Family Planning and Health Components in Community Based Distribution (CBD) Projects, Charlottesville, Virginia, January 12-14, 1982. 15 p.

307. ROGERS, E.M. Communication strategies for family planning. New York, Free Press, 1973. 451 p.

*308. ROHDE, J.E. Community based nutrition programs. Presented at the Workshop on Family Planning and Health Components in Community Based Distribution (CBD) Projects, Charlottesville, Virginia, January 12-14, 1982. 16 p.

309. ROHDE, J.E. and NORTHRUP, R.S. Taking science where the diarrhoea is. In: Ciba Foundation. Acute diarrhoea in childhood. Amsterdam, Elsevier/Excerpta Medica/North-Holland, 1976. (Ciba Foundation Symposium No. 42, new series) p. 339-366.

310. ROLLO, I.M. Drugs used in the chemotherapy of helminthiasis. In: Gilman, A.G., Goodman, L.S., and Gilman, A., eds. Goodman and Gilman's the pharmacological basis of therapeutics. New York, Macmillan, 1980. p. 1013-1037.

311. RONAGHY, H.A. and SOLTER, S. Problems of rural health care delivery in Iran: is the Chinese "barefoot doctor" exportable. Shiraz, Iran, Pahlavi University School of Medicine, April 1974. 9 p. (Mimeo)

312. RUTTAN, V. Integrated rural development programs: a skeptical note. International Development Review 17(4): 9-16. November 1975.

313. SAHN, D.E. The integrated maternal and child nutrition project in India: recommendations based on a review of past experiences. Ann Arbor, Michigan Community Systems Foundation, November 1980. (Contract No. AID/SOC/C-0082/WO-12) 122 p.

314. SAI, F.T. Medical back-up for community-based distribution programmes. In: International Planned Parenthood Federation [IPPF]. East and South East Asia and Oceania Region [ESEAOR]. Regional Medical Committee and Family Planning Organization of the Philippines. Seminar workshop on the role of FPA clinics in relation to community-based family planning services, Manila, February 6-11, 1975. [Kuala Lumpur, Malaysia, IPPF/ESEAOR, 1975]. p. 31-35.

*315. SALKEVER, D. and SIRAGELDIN, I. Cost-benefit and cost-effective analysis in population programs: its role in program planning and management. Prepared for the International Workshop on Cost-effectiveness Analysis and Cost-benefit Analysis in Family Planning Programs, St. Michaels, Maryland, August 17-20, 1981. 107 p.

316. SARAYA, A.K., TANDON, B.N., and RAMACHANDRAN, K. A study of iron and protein deficiency in hookworm infestation. Indian Journal of Medical Research 58: 1234-1243. September 9, 1970.

317. SARMA, R.S.S. and FARUQEE, R. Achievements in family planning use. In: Taylor, C.E., Sarma, R.S.S., Parker, R.L., Reinke, W.A., and Faruqee, R. Integration of family planning and health services: the Narangwal experience. [Washington, D.C.], World Bank, March 1980. 50 p.

318. SAULNIERS, S.S. Rural health delivery system project in Haiti: report no. 4. July 1978. 76 p. (Unpublished)

319. SAUNDERS, S. [Triton Corp.] [Egyptian social marketing program] Personal communication, July 7, 1982.

320. SCHELLSTEDE, W. [Population Services International] [Social marketing of ORS in Bangladesh] Personal communication, July 20, 1982.

321. SCHMIDT, L.H., HARRISON, J., ROSSAN, R.N., VAUGHAN, D., and CROSBY, R. Quantitative aspects of pyrimethamine-sulfonamide synergism. American Journal of Tropical Medicine and Hygiene 26(5, Pt. 1): 837-849. September 1977.

•322. SCRIMSHAW, N.S., BÉHAR, M., GUZMÁN, M.A., and GORDON, J.E. Nutrition and infection field study in Guatemalan villages, 1959-1964: An evaluation of medical, social, and public health benefits with suggestions for future field study. Archives of Environmental Health 18: 51-62. January 1969.

323. SCHRIMSHAW, N.S., GUZMÁN, M.A., and GORDON, J.E. Nutrition and infection field study in Guatemalan villages, 1959-1964. 1. Study plan and experimental design. Archives of Environmental Health 14: 657-662. May 1967.

324. SEAH, S.K.K. Mebendazole in the treatment of helminthiasis. Canadian Medical Association Journal 115: 777-779. October 23, 1976.

325. SEGALL, A.J., VANDERSMIDT, H., BURGLASS, R. and FROSTMAN, T. Systematic course design for health fields. New York, John Wiley & Sons, 1975. 171 p.

326. SEGALL, M. Growth charts for developing countries. Lancet 1(8130): 1352-1353. June 23, 1979.

327. SEO, B.-S. Studies on the control problems of ascariasis in Korea: final report on research programme (1980). In: Asian Parasite Control Organization [APOC]. The Seventh Asian Parasite Control/Family Planning Conference, Manila, October 6-10, 1980: proceedings. Tokyo, APCO Secretariat, [1981]. p. 285-329.

328. SEO, B.-S., CHO, S.-Y., and CHAI, J.-Y. Reduced single dose of mebendazole in treatment of *Ascaris lumbricoides* infection. Korean Journal of Parasitology 16(1): 21-25. June 1978.

329. SEO, P.K. Coordination, future strategies and some problems of the integrated project of Korea. In: Regional Organization for Inter-Governmental Cooperation and Coordination in Population and Family Planning in Southeast Asia [IGCC]. Report on the joint IGCC/JOICFP/NFPB, Malaysia Workshop/Seminar for More Effective Promotion and Management of Intergrated Projects (Family Planning and Parasite Control), Kuala Lumpur, Malaysia, February 18-23, 1979. Kuala Lumpur, IGCC Secretariat, 1979. p. 131-134.

330. SHAH, K.P. Maternal nutrition in deprived populations. Assignment Children, No. 55-56, 1981. p. 41-72.

331. SHAH, P.M., JUNNARKAR, A.R., MONTEIRO, D.D., and KHARE, R.D. The effect of periodic deworming on the nutritional status of preschool community: a preliminary communication. Indian Pediatrics 12(10): 1015-1020. October 1975.

332. SHEDLIN, M.G. Anthropology and family planning: culturally appropriate intervention in a Mexican community. [Doctoral dissertation] New York, Columbia University, 1982. 289 p.

333. SIDEL, V.W. and SIDEL, R. Health care services as part of China's revolution and development. In: Maxwell, N., ed. China's road to development. 2nd ed. Elmsford, New York, Pergamon Press, 1979. p. 155-168.

334. SIMMONDS, S.P. and WALKER, G.J.A. Essential drugs for primary-health-care standard packages. Lancet 1(8269): 435-436. February 20, 1982.

335. SIMMONS, G.B., SMUCKER, C., MISRA, B.D., and MAJUMDAR, P. Patterns and causes of infant mortality in rural Uttar Pradesh. Journal of Tropical Pediatrics and Environmental Child Health 24(5): 207-216. October 1978.

336. SINGH, I.S., SINGHI, P., and SINGH, M. Extrapyrbmidal syndrome following chloroquine therapy. Indian Journal of Pediatrics 46(373): 58-60. 1979.

337. SINHA, D.P. and BANG, F.B. The effect of massive doses of vitamin A on the signs of vitamin A deficiency in preschool children. American Journal of Clinical Nutrition 29(1): 110-115. January 1976.

338. SKINNER, A. and MOLL, F. Hypernatremia accompanying infant diarrhea. American Journal of Diseases of Children 92: 538. 1956.

339. SMITH, C.E.G. Maior disease problems in the developing world. In: Institute of Medicine. Division of International Health. Pharmaceuticals for developing countries: conference proceedings. (Washington, D.C., January 29-31, 1979) Washington, D.C., National Academy of Sciences, 1979. (Publication No. TOM-79-001) p. 30-48.

340. SMITH, R. Primary health care: diarrhetoric or reality? Practical consideration from field experiences. In: Brems, S., ed. Message from Calcutta: highlights of the 3rd International Congress of the World Federation of Public Health Associations [WFPHA] and the 25th Annual Conference of the Indian Public Health Association (Primary Health Care: World Strategy Calcutta, India, February 23-26, 1981, Washington, D.C., WFPHA Secretariat, 1982. p. 77-85.

341. SNYDER, J.D. and MERSON, M.H. The magnitude of the global problem of acute diarrhoeal disease: a review of active surveillance data. Bulletin of the World Health Organization 60(4): 605-614. 1982.

342. SOEJATNI, D. Family planning nutrition an integrated program in Bali Indonesia. Presented at the Workshop on Family Planning and Health Components in Community Based Distribution (CBD) Projects, Charlottesville, Virginia, January 12-14, 1982. 36 p.

343. SOLON, F., FERNANDEZ, T.L., LATHAM, M.C., and POPKIN, B.M. An evaluation of strategies to control vitamin A deficiency in the Philippines. American Journal of Clinical Nutrition 32(7): 1445-1453. July 1979.

344. SOLTER, S.L. Additional observations on rural health development. A. The pilot-project/experimental trap. In: O'Connor, R. W., ed. Managing health systems in developing areas: experiences from Afghanistan. Lexington, Massachusetts, D.C. Heath, 1980. p. 139-143.

345. SOLTER, S.L. Additional observations on rural health development. B. The integration versus vertical program question. In: O'Connor, R.W., ed. Managing health systems in developing areas: experiences from Afghanistan. Lexington, Massachusetts, D.C. Heath, 1980. p. 143-147.

•346. SOLTER, S.L., CROSS, P.N., and LESAR, J.W. Beyond the BHC: development of primary health care programs. In: O'Connor, R.W., ed. Managing health systems in developing areas: experiences from Afghanistan. Lexington, Massachusetts, D.C. Heath, 1980. p. 39-87.

347. SOMMER, A. Field guide to the detection and control of xerophthalmia. Geneva, World Health Organization, 1978. p. 1-48.

348. SOMOGYI, J.C. Nutritional problems in developing and industrial countries and possibilities for their solution. Bibliotheca Nutritio et Dieta 28: 1-11. 1979.

349. STACE, J.D. and PARIWA, S. Reduction in malaria parasite rate in young children by distribution of prophylactic amodiaquine through voluntary village workers. Papua New Guinea Medical Journal 24(4): 254-260. December 1981.

350. STANBURY, J.B., ERMANS, A.M. HETZEL, B.S., PRETELL, E.A., and QUERIDO, A. Endemic goitre and cretinism: public health significance and prevention. WHO Chronicle 28(5): 220-228. May 1974.

351. STANFIELD, J.P. Immunization: current major issues. In: Jelliffe, D.B. and Jelliffe, E.F., eds. Advances in international maternal and child health. Vol. 1. Oxford, England, Oxford University Press, 1981. p. 1-23.

352. STEPHENSON, L.S., CROMPTON, D.W.T., LATHAM, M.C., SCHULPEN, T.W.J., NESHEIM, M.C., and JANSEN, A.A.J. Relationships between Ascaris infection and growth of malnourished preschool children in Kenya. American Journal of Clinical Nutrition 33(5): 1165-1172. May 1980.

353. STEWART, M.M., DWORKIN, D., and ROGERS, B.L. A review of health, population, and nutrition activities in Thailand: period July 9-July 30, 1980. Washington, D.C., American Public Health Association, International Health Programs, 1980. 63 p.

•354. STINSON, W. Community financing of primary health care. Washington, D.C., American Public Health Association, International Health Programs, 1982. (Primary Health Care Issues Series 1, No. 4) 90 p.

355. STROMERG, J. Community involvement in solving local health problems in Ghana. Inquiry 12(2, Suppl.): 148-155. June 1975.

356. SULLESTA, E.O. Oral rehydration in the Philippines: experiences on training and in the implementation. [1978]. 11 p. (Unpublished)

357. SULLESTA, R.N. and NALIN, D.R. An evaluation of the oral rehydration therapy program of the Ministry of Health of the Government of Jordan. Washington, D.C., American Public Health Association, International Health Programs, 1981. (Contract No. AID/DSPE-C-0053). 71 p.

358. SURYANINGSIH, G. [Indonesian Integrated Village Family Planning/Nutrition/ORT Project] [Project information] Personal communication, July 29, 1982.

359. SUYADI, A. Primary care in the village: an approach to village self-help health programmes. Tropical Doctor 7:123-128. July 1977.

360. TALLO, V. Extent of children's immunization coverage in Bohol: October 1977. Tagbilaran City, Philippines, Department of Health, Bohol Province Maternal Child Health/Family Planning Project, June 1978. (Research Note No. 40) 11 p.

361. TAYLOR, C. Planning for implementation. In: Brems, S., ed. Message from Calcutta: highlights of the 3rd International Congress of the World Federation of Public Health Associations [WFPHA] and the 25th Annual Conference of the Indian Public Health Association (Primary Health Care: World Strategy, Calcutta, India, February 23-26, 1981) Washington, D.C., WFPHA Secretariat, 1982. p. 70-77.

362. TAYLOR, C.E., KIELMANN, A.A., DE SWEEMER, C., PARKER, R.L., CHERNICHOVSKY, D., UBEROI, I.S., MASIH, N., KAKAR, D.N., SARMA, R.S.S., and REINKE, W.A. Malnutrition, infection, growth and development: the Narangwal experience. [Washington, D.C.], World Bank, [1980]. 113 p.

363. TAYLOR, C.E., SARMA, R.S.S., PARKER, R.L., and REINKE, W.A. Integration of family planning and health services: the Narangwal experience. [Washington, D.C.], World Bank, March 1980. 417 p. (Unpublished)

364. TAYLOR, C.E. and SINGH, R.D. The Narangwal population study. Narangwal, Punjab, India, Rural Health Research Center, 1975. 430 p.

365. TAYLOR, H.C., Jr. and BERELSON, B. Comprehensive family planning based on maternal/child health services: a feasibility study for a world program. Studies in Family Planning 2(2): 22-54. February 1971.

366. TEKCE, B. Oral fluid therapy and diarrheal mortality among children in twelve Egyptian villages. Presented at the Workshop on Family Planning and Health Components in Community Based Distribution (CBD) Projects, Charlottesville, Virginia, January 12-14, 1982. 52 p.

367. TEN DAM, H.G. and HITZE, K.L. Does BCG vaccination protect the newborn and young infants? Bulletin of the World Health Organization 58(1): 37-41. 1980.

368. THAPA, R. Community Health Leader Program in Nepal: a self help mechanism for health. Presented at the 25th Anniversary Conference of the Society for International Development, Baltimore, Maryland, July 18-22, 1982. 12 p.

369. THOMPSON, D. Community owned and financed primary health care in Chad. In: Norris, J., ed. Financing health services in developing countries. (Proceedings of the 1982 International Health Conference, Washington, D.C., June 13-16, 1982) (To be published by National Council for International Health)

370. THORNE, M.C. In-service training for the supervisor of primary health care workers. In: Campbell, J.M., ed. The training and support of primary health care workers. (Proceedings of the 1981 International Health Conference, Washington, D.C., June 15-17, 1981) Washington, D.C., National Council for International Health, 1980. p. 201-206.

371. THORNE, M.C. Report of consultation with C.B.Z.O. in Nsano Mpangu, Zaire in April 1981 for community based distribution project with Tulane University. 1981. 83 p. (Unpublished, limited availability)

372. TRIPATHY, K., DUQUE, E., BOLAÑOS, O., LOTERO, H., and MAYORAL, L.G. Malabsorption syndrome in ascariasis. American Journal of Clinical Nutrition 25(11): 1276-1281. November 1972.

373. TRIPATHY, K., GONZÁLEZ, F., LOTERO, H., and BOLAÑOS, O. Effects of *Ascaris* infection on human nutrition. American Journal of Tropical Medicine and Hygiene 20(2): 212-218. 1971.

374. UDO, A.A. and WEISS, E. The Calabar Rural MCH/FP Project: 1975-1979: what we have learned about family planning. In: Atkins, B.S., ed. Maternal and Child Health/Family Planning Program Technical Workshop, New York, October 31-November 2, 1979: proceedings. New York, Population Council, June 1980. p. 188-218.

375. ULIN, P.R. and ULIN, R.O. The use and non-use of preventive health services in a southern African village. International Journal of Health Education 24(1): 45-53. 1981.

376. UMEZ-ERONINI, E.M. and ERONINI, E.A. Chloroquine induced involuntary movements. British Medical Journal 1(6066): 945-946. April 9, 1977.

377. UNHANAND, M. Thailand: summary report of the Thai Integrated Family Planning and Parasite Control Program 1976-1980. In: Asian Parasite Control Organization [APCO]. The Seventh Asian Parasite Control/Family Planning Conference, Manila, October 6-10, 1980: proceedings. Tokyo, APCO Secretariat, [1981]. p. 188-206.

378. UNITED NATIONS CHILDREN'S FUND [UNICEF]. Oral rehydration salts. New York, UNICEF, May 28, 1980. 3 p. (Mimeo)

379. UNITED NATIONS CHILDREN'S FUND [UNICEF]. PACKING AND ASSEMBLY CENTER [UNIPAC]. UNIPAC catalogue price list. New York, UNICEF, 1982. 1053 p.

•380. UNITED NATIONS [UN]. ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC [ESCAP]. Regional Seminar on Evaluation of Schemes and Strategies for Integrated Family Planning Programmes with Special Reference to Increased Involvement of Local Institutions. New York, UN, 1981. (Asian Population Studies Series No. 51: ST/ESCAP/161) 90 p.

381. UNITED NATIONS [UN]. ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC [ESCAP]. Report of a comparative study on the administration of family planning programmes in the ESCAP region: organizational determinants of performance in family planning services. Bangkok, UN, 1977. (Asian Population Studies Series No. 29: ST/ESCAP/16) 48 p.

382. UNITED NATIONS [UN]. ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC [ESCAP]. Report and selected papers of the Expert Group Meeting on Organizational Aspects of Integrating Family Planning with Development Programmes. (Bangkok, November 29-December 4, 1976) Bangkok, UN, 1977. (Asian Population Studies Series No. 36: ST/ESCAP/38) 46 p.

•383. UNITED STATES. AGENCY FOR INTERNATIONAL DEVELOPMENT. OFFICE OF POPULATION. Operations Research Program. November 1981. 22 p. (Unpublished)

384. UNITED STATES. AGENCY FOR INTERNATIONAL DEVELOPMENT [AID]. OFFICE OF POPULATION. Operations research program. [Washington, D.C.], AID, 1982. 9 p. (Mimeo)

385. VACHROTAI, S. and WILSON, R.G. New horizons for integrated health services and primary health care in Thailand, the Lampang Health Development Project. In: Regional Organization for Inter-Governmental Cooperation and Coordination in Population and Family Planning in Southeast Asia [IGCC]. A report on the Joint JOICFP/IGCC Workshop on an Integrated Approach at Grassroots Level Towards Family Planning and Health Programme with Particular Emphasis on Nutrition and Parasite Control, Genting Highlands and Kuala Lumpur, Malaysia, March 23-25, 1977. Kuala Lumpur, IGCC, [1977]. p. 94-105.

386. VALEZA, F.S. The integrated family planning, nutrition and parasite control project. In: Regional Organization for Inter-Governmental Cooperation and Coordination in Population and Family Planning in Southeast Asia [IGCC]. Report on the joint IGCC/JOICFP/NFPB, Malaysia Workshop/Seminar for More Effective Promotion and Management of Integrated Projects (Family Planning and Parasite Control), Kuala Lumpur, Malaysia, February 18-23, 1979: Secretariat. Kuala Lumpur, IGCC, 1979. p. 140-142.

387. VIRAVAIDYA, M. Summary report of the Thai integrated family planning and parasite control programme: September 1976-September 1978. In: Asian Parasite Control Organization [APCO]. The Fifth Conference of the Asian Parasite Control Organization—the Integrated Family Planning Project—Jakarta, November 6-10, 1978: proceedings. Tokyo, APCO Secretariat, [1979]. p. 187-213.

388. WALSH, J.A. Authors' reply [to articles by Berman and Gish on selective primary health care]: comments of Julia A. Walsh. Social Science and Medicine 16(10): 1060-1061. 1982.

•389. WALSH, J.A. and WARREN, K.S. Selective primary health care: an interim strategy for disease control in developing countries. New England Journal of Medicine 301(18): 967-974. November 1, 1979.

390. WALSH, J.A. and WARREN, K.S. Selective primary health care: an interim strategy for disease control in developing countries. Social Science and Medicine 14C(2): 145-163. June 1980.

•391. WANG, L.V. A global review of training of community health workers. 1981. (Unpublished)

392. WARREN, K.S. The control of helminths: nonreplicating infectious agents of man. In: Breslow, L., Fielding, J.E., and Lave, L.B., eds. Annual review of public health. Palo Alto, California, Annual Reviews Inc., 1981. p. 101-115.

393. WASSENBERG, R.E. Community nutrition component of the Lampang Health Development Project, Ministry of Public Health, Kingdom of Thailand. [Consultant report] May 1978. 48 p. (Unpublished)

394. WATSON, W., ROSENFIELD, A., VIRAVAIDYA, M., and CHANAWONGSE, K. Health, population, and nutrition: interrelations, problems, and possible solutions. In: Hauser, P.M., ed. World population and development challenges and prospects. Syracuse, New York, Syracuse University Press, 1979. p. 145-173.

395. WAWER, M.J. Day by day description of training CBZOCBD program Bas Zaire. [FRE, ENG] April 1981. 71 p. (Unpublished)

396. WAWER, M.J. PRODEF Bas Zaire community based health and family planning project. Trip Report, August 3-15, 1981. 26 p. (Unpublished, limited availability)

397. WAWER, M.J. PRODEF Family Planning and Health Project, Bas Zaire, August 22-September 1, 1982: trip report. 8 p. (Unpublished, limited availability)

398. WAWER, M.J. Second visit to VDMS project expansion, Morocco. Trip Report. [Baltimore, Maryland], Johns Hopkins University, November 18-22, 1981. 5 p. (Unpublished, limited availability)

*399. WAWER, M.J. and MERCER, M.A. The training of workers for community-based family planning and health projects. Baltimore, Johns Hopkins University, School of Hygiene and Public Health, June 23, 1982. 28 p.

400. WEISS, E. Extension of successful training projects to national primary health care worker training: lessons of the Calabar experience. In: Campbell, J.M., ed. The training and support of primary health care workers. (Proceedings of the 1981 International Health Conference, Washington, D.C., June 15-17, 1981) Washington, D.C., National Council for International Health, 1980. p. 113-118.

401. WEISS, E. Nigeria trip report: February 17-March 16, 1982. 1982. 94 p. (Unpublished, limited availability)

*402. WERNER, D. Where there is no doctor: a village health care handbook. (Translation of Dande no hay doctor). 6th ed. Palo Alto, California, Hesperian Foundation, 1981. 403 p.

*403. WERNER, D. and BOWER, B. Helping health workers learn. Palo Alto, California, Hesperian Foundation, 1982. 632 p.

404. WERNSDORFER, W.H. and KOUZNETSOV, R.L. Drug-resistant malaria—occurrence, control, and surveillance. Bulletin of the World Health Organization 58(3): 341-352. 1980.

405. WESSLEY, S. [Sudan Community Based Health and Family Planning Project] [Project information] Personal communication to Maria Wawer, March 1981.

406. WIENIAWSKI, W. Checks and balances. World Health, May 1981. p. 20-23.

407. WILKINS, J. and WEHRLE, P.F. Additional evidence against measles vaccine administration to infants less than 12 months of age: altered immune response following active/passive immunization. Journal of Pediatrics 94(6): 865-869. June 1979.

408. WILLETT, W.C., KILAMA, W.L., and KIHAMIA, C.M. *Ascaris* and growth rates: a randomized trial of treatment. American Journal of Public Health 69(10): 987-991. October 1979.

409. WILLIAMSON, N.E. An attempt to reduce infant and child mortality in Bohol, Philippines. Studies in Family Planning 13(4): 106-117. April 1982.

410. WILLIAMSON, N.E. Outcome indicators used to evaluate the Bohol Project. In: Campbell, J.M., ed. International health: measuring progress. (Proceedings of the 1980 International Health Conference, Washington, D.C., June 11-13, 1980) Washington, D.C., National Council for International Health, 1980. p. 30-33.

411. WINIKOFF, B. and BROWN, G. Nutrition, population and health: theoretical and practical issues. Social Science and Medicine 14C(2): 171-176. June 1980.

412. WONG, H.B. Rice water in the treatment of gastroenteritis. Lancet 2(8237): 102-103. July 11, 1981.

413. WORLD HEALTH ORGANIZATION [WHO]. Financing of health services. Geneva, WHO, 1978. (WHO Technical Report Series No. 65) 117 p.

*414. WORLD HEALTH ORGANIZATION [WHO]. Intestinal protozoan and helminthic infections. Geneva, WHO, 1981. (Technical Report Series No. 666) 152 p.

415. WORLD HEALTH ORGANIZATION [WHO]. Nutrition and infection. Geneva, WHO, 1965. (Technical Report Series No. 314) 33 p.

*416. WORLD HEALTH ORGANIZATION [WHO]. Nutritional anaemias. Geneva, WHO, 1968. (Technical Report Series No. 405) 40 p.

417. WORLD HEALTH ORGANIZATION [WHO]. The prevalence of nutritional anaemia in women in developing countries. Geneva, WHO, 1979. (FHE/79.3) 118 p.

418. WORLD HEALTH ORGANIZATION [WHO]. The role of the health sector in food and nutrition. Geneva, WHO, 1981. (Technical Report Series No. 667) 94 p.

419. WORLD HEALTH ORGANIZATION [WHO]. Treatment and prevention of dehydration in diarrhoeal diseases: a guide for use at the primary level. Geneva, WHO, 1976. 31 p.

420. WORLD HEALTH ORGANIZATION [WHO]. Vitamin A deficiency and xerophthalmia: report of a joint WHO/USAID meeting. Geneva, WHO, 1976. (Technical Report Series No. 590) 88 p.

421. WORLD HEALTH ORGANIZATION [WHO]. DIARRHOEAL DISEASES CONTROL PROGRAMME. Clinical management of acute diarrhoea: report of a Scientific Working Group, New Delhi, October 30-November 2, 1978. [Geneva, WHO, 1979]. (WHO/DDC/79.3) 21 p.

422. WORLD HEALTH ORGANIZATION [WHO]. DIARRHOEAL DISEASES CONTROL PROGRAMME. Report of the WHO/UNICEF Consultation on the National Production, Packaging and Distribution of Oral Rehydration Salts (ORS), Bangkok, January 23-26, 1979. [Geneva], WHO, 1979. (ATH/79.1) 33 p.

423. WORLD HEALTH ORGANIZATION [WHO]. UNITED NATIONS CHILDREN'S FUND. Primary health care. Report of the International Conference on Primary Health Care, Alma-Ata, USSR, September 6-12, 1978. 6 p.

424. WORLD HEALTH ORGANIZATION [WHO]. WHO EXPERT COMMITTEE ON MALARIA. Seventeenth report. Geneva, WHO, 1979. (Technical Report Series No. 640) 71 p.

425. WORLD HEALTH ORGANIZATION [WHO]. PROGRAMME FOR CONTROL OF DIARRHOEAL DISEASES. Guidelines for the trainers of community health workers on the treatment and prevention of acute diarrhoea. Geneva, WHO, 1980. (WHO/CDD/SER/80.1) 29 p.

*426. WORLD HEALTH ORGANIZATION [WHO]. PROGRAMME FOR CONTROL OF DIARRHOEAL DISEASES. Logistics. [Training module] [Geneva, WHO, 1980]. 45 p.

427. YANG, J.-M. Primary health care with special reference to nutrition, MCH and family planning. In: Peng, J.Y., ed. A report on the Joint IGCC/IFRP Seminar on Regional Fertility Research held in Bangkok, Thailand, July 18-20, 1979. Kuala Lumpur, Malaysia, Inter-Governmental Coordinating Commitee, 1979.

428. YIP, W.C.L., HO, T.F., TAY, J.S.H., and WONG, H.B. [Oral rehydration for diarrhea.] [Letter] New England Journal of Medicine 15(307): 952. October 7, 1982.

429. YOUNG, M.D. Malaria. In: Hunter, G.W., ed. Tropical medicine. 5th ed. Philadelphia, W.B. Saunders, 1976. p. 353-396.

430. ZEITLIN, M. [Tufts University] [Integration and community] Personal communication, September 25, 1982. 2 p.

431. ZEITLIN, M.F. and FORMACION, C.S. Nutrition education. In: Austin, J.E. and Zeitlin, M.F., eds. Nutrition intervention in developing countries: an overview. Cambridge, Massachusetts, Oelgeschlager, Gunn & Hain, 1981. p. 49-72.

432. ZEITLIN, M.F., PYLE, D.F., AUSTIN, J.E., SEMPORE, G., and GOUBA, E. Circumference growth charts for community level workers with little or no formal schooling. Journal of Tropical Pediatrics 28(2): 62-68. April 1982.

433. ZEITLIN, M.F., WRAY, J.D., STANBURY, J.B., SCHLOSSMAN, N.P., MEURER, M.J., and WEINTHAL, P.J. Nutrition and population growth: the delicate balance. Cambridge, Massachusetts, Oelgeschlager, Gunn and Hain, 1982.

434. ZSCHOCK, D.K. Health care financing in developing countries. Washington, D.C., American Public Health Association, 1982. (Monograph Series No. 1) 82 p.

ADDENDA

435. ANONYMOUS. Programa integrado de México. [Mexican integrated program.] [SPA] In: Japanese Organization for International Cooperation in Family Planning, and Fundación para Estudios de la Población [FEPAC]. Segunda Conferencia Americana de Programas Integrados (CAPRI 2), México, D.F., 16-22 agosto 1981. [Second American Conference on Integrated Programs (CAPRI 2), Mexico, D.F., August 16-22, 1981] [SPA] [Proceedings]. Mexico, D.F., FEPAC, [1982]. p. 99-122.

436. ALDERMAN, M.H., WISE, P.H., FERGUSON, R.P., LAVERDE, H.T., and D'SOUZA, A.J. Reduction of young child malnutrition and mortality in rural Jamaica. Journal of Tropical Pediatrics and Environmental Child Health 24(1): 7-11. February 1978.

*437. AMERICAN PUBLIC HEALTH ASSOCIATION [APHA]. INTERNATIONAL HEALTH PROGRAMS. Workshop report: Malaria Control in PHC in Africa, [Washington, D.C.] June 28-July 2, 1982. Washington, D.C., APHA, 1982. 34 p. (Unpublished, limited availability)

438. BAKER, C.E., Jr. Aralen phosphate: brand of chloroquine phosphate, USP, with primaquine phosphate, USP. In: Baker, C.E., Jr., pub. Physicians' desk reference. 36th ed. Oradell, New Jersey, Medical Economics Co., 1981. p. 2022-2024.

439. BERGGREN, G. [Harvard University School of Public Health] [Description of Integrated Project of Population and Health, Haiti] Personal communication, October-November 1982.

440. BERGGREN, W.L., EWBANK, D.C., and BERGGREN, G.G. Reduction of mortality in rural Haiti through a primary-health-care program. New England Journal of Medicine 304(22): 1324-1330. May 28, 1981.

441. CLEMENTS, F.W., GIBSON, H.B., and HOWELER-COY, J.F. Goitre studies in Tasmania. Bulletin of the World Health Organization 382: 297-318. 1968.

442. COLUMBIA UNIVERSITY. CENTER FOR POPULATION AND FAMILY HEALTH [CPFH]. New Strategies for the Delivery of Maternal/Child Health and Family Planning Services in the rural and semi-urban areas of Mexico. Revised report. (AID Contract No. AID/pha-C-1200). (To be published by CPFH).

443. CORREU AZCONA, S. [Directorate-General of Maternal and Child Health/Family Planning, Mexico] [Description of Mexican Rural Health Program] Personal communication, November 1982.

444. DAROUGAR, S., JONES, B.R., VISWALINGAM, N., POIRIER, R.H., ALLAMI, J., HOUSHMAND, A., FARAHMANDIAN, M.A., and GIBSON, J.A. Family-based suppressive intermittent therpay of hyperendemic trachoma with topical oxytetracycline or oral doxycycline. British Journal of Opthalmology 64: 291-295. 1980.

445. DAWSON, C.R., DAGHFOUS, T., WHITCHER, J., MESSADI, M., HOSHIWARA, T., TRIKI, F., CHADGRAH, F., BRIONES, O., YONEDA, C., and SCHACHTER, J. Intermittent trachoma chemotherapy: a controlled trial of topical tetracycline or erythromycin. Bulletin of the World Health Organization 59(1): 91-97. 1981.

446. DAWSON, C.R., JONES, B.R., TARIZZO, M.L. Guide to trachoma control in programmes for the prevention of blindness. Geneva, World Health Organization, 1981. 56 p.

447. DENNIS, F. An Indian experiment in grassroots family planning. People 9(3): 32-33. 1982.

448. DENNIS, F. [International Planned Parenthood Federation] [Description of Varanasi project, India] Personal communication, October 25, 1982.

449. EDMUNDSON, W. Applied nutritional geography: priorities and praxis. Social Science & Medicine 14D(2): 133-137. June 1980.

450. ELKINS, H. [Center for Population and Family Health] [Description of New Strategies project, Mexico] Personal communication, October 22, 1982.

451. FARUQEE R. and JOHNSON, E. Health, nutrition, and family planning: a survey of experiments and special projects in India (Prepared for Research Project 671-38, Narangwal Population and Nutrition). Washington, D.C., World Bank, May 1981. (Population and Human Resources Division Discussion Paper no. 81-14) 96 p.

452. GALBA ARAUJO, G. [Maternidade Escola Assis Chateaubriand, Ceará, Brazil] [Training midwives] Personal communication, September 16, 1982.

453. GRIFFITHS, M. Growth monitoring of preschool children: practical considerations for primary health care projects. Washington, D.C., American Public Health Association, International Health Programs, October 1981. (Primary Health Care Issues Series I, No. 3) 70 p.

454. HANKS, L.M., Jr., HANKS, J.R., JANLEKHA, K., EMARUN, A., KONGSA, J., and SUDSANEH, S. Diptheria immunization in a Thai community. In: Paul, B.D. and Miller, W.B., eds. Health, culture and community. New York, Russell Sage Foundation, 1955. p. 155-185.

455. HENN, A. [US Agency for International Development] [Proposed delivery of chloroquine to all homes for treatment of acute malaria cases.] Personal communication, October 7, 1982.

456. HETZEL, B.S., THILLY, C.H., FIERRO-BENITEZ, R., PRETELL, E.A., BUTTFIELD, I.H., and STANBURY, J.B. Iodized oil in the prevention of endemic goiter and cretinism. In: Stanbury, J.B. and Hetzel, B.S., eds. Endemic goiter and endemic cretinism. New York, John Wiley & Sons, 1980. p. 513-532.

*457. INTERNATIONAL PLANNED PARENTHOOD FEDERATION [IPPF]. PROGRAMME DEVELOPMENT DEPARTMENT [PDD]. Community participation in family planning: issues and examples. London, IPPF, July 1982. 42 p.

458. KEVANY, J., FIERRO-BENITEZ, R., PRETELL, E.A., and STANBURY, J.B. Prophylaxis and treatment of endemic goiter with iodized oil in rural Ecuador and Peru. American Journal of Clinical Nutrition 22(12): 1597-1607. December 1969.

459. KEYSTONE, J.S. and MURDOCH, J.K. Mebendazoie. Annals of Internal Medicine 91(4): 582-586. October 1979.

460. KING, M.H., KING, F.M.A., MORLEY, D.C., BURGESS, H.J.L., and BURGESS, A.P. Helping families to help themselves. In: Nutrition for developing countries. Nairobi, Kenya, Oxford University Press, 1972. p. 10.1-10.13.

461. MAGUIRE, E.S., WAY, A.A., and AYAD, M. The delivery and use of contraceptive services in rural Tunisia. International Family Planning Perspectives 8(3): 96-101. September 1982.

462. MANSOUR, T.F. Chemotherapy of parasitic worms: new biochemical strategies. Science 205(4405): 462-469. August 3, 1979.

463. MEXICO. MINISTRY OF HEALTH. MATERNAL/CHILD HEALTH AND FAMILY PLANNING DIRECTORATE. and COLUMBIA UNIVERSITY. CENTER FOR POPULATION AND FAMILY HEALTH. New Strategies for the Delivery of Maternal/Child Health and Family Planning Services in the Rural and Semi-Urban Slum Areas of Mexico. [Project proposal] July 1977. 100 p. (Unpublished, limited availability)

464. NATIONAL COUNCIL FOR INTERNATIONAL HEALTH [NCIH] and COLUMBIA UNIVERSITY. CENTER FOR POPULATION AND FAMILY HEALTH [CPFH]. Approaches to integrated programs: health, family planning and development. Proceedings of a strategy workshop sponsored by NCIH and CPFH, Washington, D.C., April 12-14, 1982. Washington, D.C., NCIH, 1982. 36 p.

465. PHAROAH, P.O.D., BUTTFIELD, I.H., and HETZEL, B.S. Neurological damage to the fetus resulting from severe iodine deficiency during pregnancy. Lancet 1(7694): 308-310. February 13, 1971.

466. PONNAMPALAM, J.T. Chemotherapy of malaria. Tropical Medicine 10(1): 99-106. January 1981.

467. PYLE, D. and CHOWDHURY, S.A. Voluntary agency health, nutrition and population projects in rural Bangladesh—lessons and potential. [Prepared for the Ford Foundation] August 1980. 131 p. (Unpublished)

468. ROHDE, J.E., HULL, T.H., and HENDRATA, L. Who dies of what and why? Prisma: Indonesian Journal of Social and Economic Affairs, No. 9, p. 26-37. 1978.

469. SALVERAGLIO, F.J. Gaining public acceptance of prophylaxis: experience from the campaign against endemic goiter in Uruguay. In: Dunn, J.T., ed. Endemic goiter and cretinism: continuing threats to world health. Washington, D.C., Pan American Health Organization, 1974. (Scientific Publication No. 292) p. 198-204.

470. SAMUEL, S. Analysis and description of Profamilia's commercial retail sales program: Colombia. January 25-February 1, 1982. Washington, D.C., Futures Group. International Contraceptive Social Marketing Project, 1982. 26 p.

471. SCHULTZ, M.G. The effects of *Ascaris lumbricoides* infection on nutritional status. Prepared for Workshop on Interactions of Parasitic Diseases and Nutrition, Bellagio, Italy, September 27-October 1, 1980. 11 p.

472. SIMPSON-HEBERT, M. Special people as midwives. Populi 9(2): 34-37. 1982.

473. SMITH, R.A. Designing an appropriate approach to improved health service coverage. In: Manpower and primary health care. Honolulu, University Press of Hawaii, 1978. p. 17-37.

474. THILLY, C.H., DELANGE, F., RAMIOUL, L., LAGASSE, R., LUVIVILA, K., and ERMANS, A.M. Strategy of goitre and cretinism control in Central Africa. International Journal of Epidemiology 6(1): 43-54. March 1977.

475. THILLY, C.H. and HETZEL, B.S. An assessment of prophylactic programs: social, political, cultural, and economic issues. In: Stanbury, J.B. and Hetzel, B.S., eds. Endemic goiter and endemic cretinism. New York, John Wiley & Sons, 1980. p. 475-490.

476. TULADHAR, J.M. and STOECKEL, J. The relative impacts of vertical and integrated FP/MCH programs in rural Nepal. Studies in Family Planning 13(10): 275-286. October 1982.

477. VIRAVAIDYA, M. Strategies for broadening the integrated project toward self-reliance and integrated community development. In: Asian Parasite Control Organization [APCO]. The Eighth Asian Parasite Control/Family Planning Conference Bangladesh, Thailand, October 19-24, 1981: proceedings. Tokyo, APCO Secretariat, [1982].

478. WATANABE, T., MORAN, D., EL TAMER, E., STANELONI, L., SALVANESCHI, J., ALTSCHULER, N., DEGROSSI, O.J., and NIEPOMINISZCZE, H. Iodized oil in the prophylaxis of endemic goiter in Argentina. In: Dunn, J.T. and Medeiros-Neto, G.A., eds. Endemic goiter and cretinism: continuing threats to world health: report of the 4th meeting of the PAHO Technical Group on Endemic Goiter held in Guarujá, São Paulo, Brazil, October 14-18, 1973. Washington, D.C., Pan American Health Organization, 1974. (Scientific Publication No. 292) p. 231-241.

479. WITTNER, M. Mycotic and parasitic diseases. In: Rudolph, A.M., ed. Pediatrics. New York, Appleton-Century-Crofts, 1977. p. 609-669.

480. WOLFSON, M. Changing approaches to population problems. [Paris], Organisation for Economic Co-operation and Development Centre, 1978. 193 p.

481. WORLD HEALTH ORGANIZATION [WHO]. The primary health worker. Geneva, WHO, 1980. 346 p.

RECENT POPULATION REPORTS

ORAL CONTRACEPTIVES—Series A

____ A-5, OCs—Update on Usage, Safety, and Side Effects *(A, F, P, S)*
____ A-6, Oral Contraceptives in the 1980s

INTRAUTERINE DEVICES—Series B

____ B-3, IUDs—Update on Safety, Effectiveness, and Research *(F, P, S)*
____ B-4, IUDs: An Appropriate Choice for Many Women

STERILIZATION, FEMALE—Series C

____ C-8, Reversing Female Sterilization *(F, P, S)*

LAW AND POLICY—Series E

____ E-6, Legal Trends and Issues in Voluntary Sterilization *(F, P, S)*

PREGNANCY TERMINATION—Series F

____ F-7, Complications of Abortion in Developing Countries *(F, P, S)*

PROSTAGLANDINS—Series G

____ G-8, The Use of PGs in Human Reproduction *(F)*

BARRIER METHODS—Series H

____ H-5, Spermicides—Simplicity and Safety are Major Assets *(F, P, S)*
____ H-6, Update on Condoms—Products, Protection, Promotion

PERIODIC ABSTINENCE—Series I

____ I-3, Periodic Abstinence: How Well Do New Approaches Work? *(F, P, S)*

FAMILY PLANNING PROGRAMS—Series J

____ J-19, Community-Based and Commercial Contraceptive Distribution *(A, F, P, S)*
____ J-20, Filling Family Planning Gaps *(F, P, S)*
____ J-21, Social Marketing: Does It Work? *(F, P, S)*
____ J-22, Traditional Midwives and Family Planning *(F, P, S)*
____ J-23, Films for Family Planning Programs *(F, P, S)*
____ J-24, Breast-feeding, Fertility, and Family Planning *(F, P, S)*
____ J-25, Population and Birth Planning in the People's Republic of China *(F, P, S)*

ISSUES IN WORLD HEALTH—Series L

____ L-1, Tobacco—Hazards to Health and Human Reproduction *(A, F, P, S)*
____ L-2, Oral Rehydration Therapy for Childhood Diarrhea *(A, F, P, S)*
____ L-3, Community-Based Health and Family Planning

SPECIAL TOPICS—Series M

____ M-2, Voluntary Sterilization: World's Leading Contraceptive Method *(A, F, P, S)*
____ M-3, The World Fertility Survey—Current Status and Findings *(A, F, P, S)*
____ M-4, Age at Marriage and Fertility *(F, P, S)*
____ M-5, Contraceptive Prevalence Surveys: A New Source of Family Planning Data *(F, P, S)*
____ M-6, Population Education in the Schools *(F, P, S)*

INDEX

____ Index 1972-1977 (to English edition only)
____ Index 1978-1980 (to English edition only)

Population Information Program, The Johns Hopkins University, 624 North Broadway, Baltimore, Maryland 21205, USA

1. Recent **Population Reports** are listed above. Check (✓) the issues you want to order in the spaces provided. **Population Reports** are free in any quantity to developing countries. In USA and other developed countries, multiple copies are $.50 each; full set of reports in print, $20.00; with binder, $25.00. Send payment in US$ with order.
2. All publications appear in English. Many are available in Arabic, French, Portuguese, and Spanish, as the abbreviations after each title indicate. Check the language you prefer: Arabic ☐, English ☐, French ☐, Portuguese ☐, Spanish ☐
3. Please type or print your name and mailing address clearly.

Last name ____________ First name ____________
Organization ____________
Address ____________
City ____________ Postal Code ____________
Country ____________

4. ☐ Send ____ copies of each future of **Population Reports**.

☐ I am already on the **Population Reports** mailing list.

☐ Please send me a binder (in developed countries, $5.00 for binder only).

☐ I do not want to receive **Population Reports** regularly.

5. Mail to address above.

POPLINE

POPLINE, a computerized literature search service, offers bibliographic citations and abstracts on any specific subject or field of interest from a collection of over 100,000 documents covering all aspects of family planning and population. **In developing countries**, searches can be obtained **free of charge** by writing to either of the organizations listed below. **In the United States**, users can subscribe to **POPLINE** through the National Library of Medicine (NLM), Bethesda, MD 20209. **POPLINE** is already available at over 1,800 institutions designated as search centers of the NLM MEDLARS system. **In other developed countries**, searches can be obtained through MEDLARS search centers or, in countries with no access to MEDLARS, through either of the institutions listed below. In developed countries, searches are free to persons employed by international development and training institutions; others may be charged.

POPLINE is produced by the Population Information Program of the Johns Hopkins University, the Library/Information Program of the Center for Population and Family Health of Columbia University, and *Population Index* of Princeton University, in cooperation with the US National Library of Medicine and with financial support from the US Agency for International Development.

To request a search, please complete the following form:

Search topic: ____________
Last name: ____________ First name: ____________
Organization: ____________
Address: ____________
City: ____________ Postal Code: ____________ Country: ____________

Mail this form to either of these addresses:

Services to developing countries free of charge.

Population Information Program
Attn: POPLINE
The Johns Hopkins University
624 North Broadway
Baltimore, Maryland 21205, USA

Center for Population and Family Health
Attn: POPLINE
Columbia University
60 Haven Avenue
New York, New York 10032, USA

3/7/83 U2520-1.22(4) A

Population Reports

Series J
Number 26
January-February 1983

FAMILY PLANNING PROGRAMS

Population Information Program, The Johns Hopkins University, Hampton House, 624 North Broadway, Baltimore, Maryland 21205, USA

Sources of Population and Family Planning Assistance

Overview. Expenditures for family planning in developing countries now amount to at least $1,000 million (US) annually. An estimated $100 million is spent by individuals paying for their own family planning supplies and services. Over $400 million is spent by national governments on their own population/family planning programs. A similar amount—about $450 million—comes from developed-country governments and private agencies. An increasing proportion of this external assistance is channeled through multilateral agencies such as the United Nations Fund for Population Activities (UNFPA), which provides grant aid; the International Planned Parenthood Federation (IPPF), which supports member family planning associations; and the World Bank, which makes long-term loans to governments. Although consistent and current data are difficult to collect, it appears that more than half of all external population and family planning assistance is now administered by or channeled through these international agencies.

Different Aid Sources

For organized population/family planning activities, there are many different sources of assistance. These include:

- national governments supporting their own national population/family planning programs,
- donor governments supporting programs in developing countries,
- private organizations, both national and international,
- intergovernmental agencies such as the United Nations Fund for Population Activities (UNFPA) and the World Bank.

National governments, especially those in Asia, have been a crucial source of funding for their own population programs. It is estimated that in 1980 developing countries excluding China provided over $400 million (US) (167) (see Table 1). In the past decade a number of governments, especially in Asia, have significantly increased the share of program costs that they assume. For example, between 1974 and 1980 national contributions to population programs rose from 41 to 69 percent in Indonesia, from 60 to 92 percent in South Korea, from 51 to 76 percent in the Philippines, and from 16 to 33 percent in Thailand (113). Substantial increases in local support also have taken place in Costa Rica, Mauritius, Nepal, Tunisia, and other countries (56). The most populous developing countries—China, India, and Indonesia—now contribute the bulk of the funding for their national population programs (113). In addition, many individuals obtain family planning services and supplies privately, from medical or commercial sources, spending their own income without using government or other outside funds. This amount has been estimated at roughly $100 million (195).

With respect to external assistance, developed-country governments are the chief source of aid (167). Although at least 130 countries have provided population assistance at some time (142), the bulk of assistance is given by a relatively small number of industrialized countries. The 12 principal donors in fiscal year 1981, ranging from largest to smallest contributor, were: the United States, Japan, Sweden, Norway, West Germany, the United Kingdom, the Netherlands, Canada, Denmark, Australia, Switzerland, and Belgium. Finland and New Zealand also contributed; the exact amounts are not available but were presumably relatively small (65) (see Table 2). Beginning in 1983 Italy will provide $4.6 million through UNFPA for projects in five countries (3).

The US Agency for International Development (US AID) remains the largest single donor, but the US share of population assistance has declined somewhat. In the early 1970s the US contributed about 60 percent of all population assistance, but by 1981 this share had dropped to 50 percent (65, 167). Some countries, including West Germany, Japan, Norway, and Sweden, have increased their contributions substantially over the last decade (see Table 2). Norway and Sweden contribute a larger percentage of their foreign assistance to population/family planning than any other donors (163), and Norway makes the largest per capita contribution—about $6.00 per year. Al-

CONTENTS

Overview J-621
National Governments J-625
Intergovernmental Agencies J-632
Nongovernmental Funding Organizations J-635
Nongovernmental Funding and Technical Assistance Organizations J-640
Nongovernmental Technical Assistance Organizations J-647
Bibliography J-653
Index to Organizations J-655

This issue of Population Reports was prepared by Dana Lewison, Sc.M., on the basis of published and unpublished materials, correspondence, and interviews. Comments and additional material are welcome.

The Population Information Program appreciates the assistance provided by representatives of nearly all of the organizations discussed in this issue. Special assistance was provided by Carl J. Hemmer, Marion O'Connor, and J. Joseph Speidel.

Population Reports (USPS 063-150) is published bimonthly (January, March, May, July, September, November) at 624 North Broadway, Baltimore, Maryland 21205, USA, by the Population Information Program of The Johns Hopkins University and is supported by the United States Agency for International Development. Second class postage paid at Baltimore, Maryland. Postmaster to send address changes to **Population Reports,** Population Information Program, The Johns Hopkins University, 624 North Broadway, Baltimore, Maryland 21205, USA.

Population Reports is designed to provide an accurate and authoritative overview of important developments in the population field. It does not represent official statements of policy by The Johns Hopkins University or the US Agency for International Development.

Phyllis T. Piotrow, Ph.D., Director; Walter Stender, Associate Director; Ward Rinehart, Editor.

though the People's Republic of China is one of the principal recipients of population assistance, governments of communist bloc countries have as yet made only small contributions to international population assistance. Information on total family planning program expenditures by the Chinese government is not available, but expenditures may equal or exceed those of all other developing countries together. In some parts of China family planning expenditures may be as much as about one percent of the value of total agricultural production (31).

Donor governments provide funding to intergovernmental agencies such as the United Nations Fund for Population Activities (UNFPA); nongovernmental organizations working in developing countries, such as the International Planned Parenthood Federation (IPPF); and developing-country governments directly (167) (see Figure 1). Most governments provide a large portion of aid multilaterally—that is, to UNFPA or IPPF. Only a few countries—Australia, Norway, Sweden, the United Kingdom, and especially the United States—provide a substantial portion of aid bilaterally—that is, directly to other governments (56, 63, 114, 157, 183). For US AID, direct bilateral assistance amounts to about two-fifths of the total (63).

Governmental assistance is of several types. Most is in cash grant form, but Canada, Denmark, Finland, West Germany, and the United States also make some loans (56). Seven of the major donor governments—Australia, Denmark, Finland, Japan, Sweden, West Germany, and the United States—provide grants in kind, primarily equipment and contraceptive supplies (56). In addition to grants and loans, donor governments offer technical assistance to developing-country governments and, less frequently, to private agencies (167).

Private Contributing Agencies

Private organizations, which are supported by governmental, intergovernmental, and private contributions, give assistance primarily to other private organizations in developing countries (167). Their contributions can be financial (usually in grant form), technical, or both. They are major innovators in research, training, and delivery of services (167).

The Rockefeller Foundation, the Ford Foundation, IPPF, and the Population Council, four of the largest private agencies,

Table 1. National Expenditures on Own Population/Family Planning Programs, Selected Countries, 1980

Country	National Expenditure (in 1,000 US$)	National Expenditure as % of Total Program Expenditure
ASIA		
Bangladesh[a]	24,000	31
Hong Kong[b]	618	69
India[c]	175,000	77
Indonesia[b]	49,258	69
Korea, Rep. of[b]	15,959	92
Malaysia, peninsular[b]	6,712	77
Nepal[c]	4,145	39
Philippines[b]	22,416	76
Singapore[b]	1,529	100
Sri Lanka[d]	1,210	20
Taiwan[b]	4,769	100
Thailand[b]	2,599	33
MIDDLE EAST & AFRICA		
Egypt[c]	11,283	33
Ghana[c]	1,235	44
Kenya[d]	3,750	32
Liberia[d]	650	28
Mauritius[b]	814	70
Morocco[c]	8,000	60
Sierra Leone[c]	134	9
Swaziland[c]	130	7
Tanzania[c]	1,152	34
Tunisia[b]	654	28
LATIN AMERICA		
Colombia[b,e]	2,758	51
Costa Rica[c]	2,496	68
Dominican Republic[c]	317	8
Ecuador[d]	4,460	71
El Salvador[b]	6,000	77
Guatemala[d]	5,520	59
Haiti[d]	1,200	32
Honduras[c]	410	34
Jamaica[c]	1,386	29
Mexico[c]	40,207	79
Panama[c]	2,585	59
Paraguay[d]	250	12
Peru[d]	1,220	23
TOTAL	404,826	

[a] Source: Muniak, E. [U.S. Agency for International Development] Personal communication (189). Annual average for 1981–83.

[b] Source: Nortman, D. L. and Fisher, J. Population and family planning programs: a compendium of data through 1981. New York, Population Council, 1982 (113). Data were obtained from countries in response to questionnaire.

[c] Source: Speidel, J.J. Cost implications of population stabilization. Presented at International Workshop on Cost-Effectiveness Analysis and Cost-Benefit Analysis in Family Planning Programs, St. Michaels, Maryland, August 17–20, 1981 (146). Data on national government contributions from estimates by US AID missions and various other sources. Includes health expenditures in some cases.

[d] Source: Speidel, J.J. Same as note c except data obtained from UNFPA.

[e] Allocated

Table 2. Population/Family Planning Assistance Provided by Major Donors, 1971–1982 (expenditures, in millions US$)

	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981[a]	1982[a]
Governments												
Australia	—	0.4	0.6	0.6	1.6	1.0	1.3	3.0	3.1	2.5	3.2[b]	4.0[b]
Belgium	0.1	0.0	0.1	0.8	0.5	0.9	2.2	2.3	1.6[b]	1.6[b]	0.8[b]	NA
Canada[c]	2.5	3.0	4.2	5.5	7.2	9.0	9.7	12.1	12.8	11.4	10.0[b,d]	11.7[b,d]
Denmark	1.9	2.3	2.0	4.8	3.5	5.0	4.4	7.7	9.3	12.5	7.5[b,e]	7.8[b,e]
Finland	0.5	0.9	1.0	2.6	2.0	1.6	1.7	0.5	0.5	1.5	0.8[d,e]	1.2[b,e]
Germany, West	1.7	2.4	4.4	5.8	13.4	8.7	14.4	17.0	35.3	20.2	22.9[b]	21.9[b,d]
Japan[f]	2.1	2.2	2.8	5.3	8.0	9.0	11.8	15.7	25.1	25.6	31.9	42.6[b]
Netherlands	1.1	2.2	3.7	5.8	6.7	8.9	9.6	12.1	13.8	15.3	12.2[b]	13.2[b]
New Zealand	—	0.1	0.0	0.6	0.9	0.6	0.6	0.6	0.6	0.6	0.7[d,e]	NA
Norway[f]	3.9	5.5	8.6	10.8	13.6	23.9	21.6	32.0	32.9	34.3	27.1[b]	25.0[b,d]
Sweden[f]	7.4	12.7	17.1	21.5	28.1	32.2	35.5	32.3	34.2	35.1	30.4[d]	22.7[b]
Switzerland	0.2	0.2	0.2	0.2	0.2	0.2	0.5	1.1	1.5	1.8	1.4[d]	NA
United Kingdom	2.3	3.3	3.9	3.0	6.8	7.3	10.9	14.1	19.5	17.7	13.1[b]	19.8[b,d]
United States[g]	109.6	121.1	115.1	110.1	106.0	119.0	145.4	166.6	184.9	186.9	185.0	211.0[b]
Others	1.3	1.6	1.7	2.3	3.6	11.4	3.9	2.6	1.6	2.8	4.8	NA
Subtotal	134.6	157.9	165.4	179.7	202.1	238.7	273.7	319.7	376.7	369.8	351.8	385[d]
Through World Bank Loans[h]												
Estimated expenditures	2.9	9.8	10.8	14.2	21.8	20.6	19.7	25.3	44.7	58.9	60.0	58.7
Major Private Donors												
Ford Foundation	21.3	16.9	15.2	14.8	10.6	11.3	10.4	10.0	8.0	6.1[b]	11.9[b]	3.7[b]
Rockefeller Foundation	6.0	6.9	10.0	9.0	8.5	8.3	8.3	8.9	9.8	9.9	4.2[b]	4.0[b]
Subtotal	27.3	23.8	25.2	23.8	19.1	19.6	18.7	18.9	17.8	16.0	16.1	7.7
TOTAL	**164.8**	**191.5**	**201.4**	**217.7**	**243.0**	**278.9**	**312.1**	**363.9**	**439.2**	**444.7**	**427.9**	**453.1**[d]

[a] Figures for 1981–82 are for donor's fiscal year. Figures for 1971–80 are for calendar years. Thus figures for 1981–82 cannot always be compared with those for 1971–80.

[b] Reported by donor in answer to inquiry by Population Information Program

[c] Excludes support for population activities of International Development Research Centre, which in 1982 amounted to about $3 million (US). See p. J-630.

[d] Estimated or provisional

[e] Multilateral assistance only

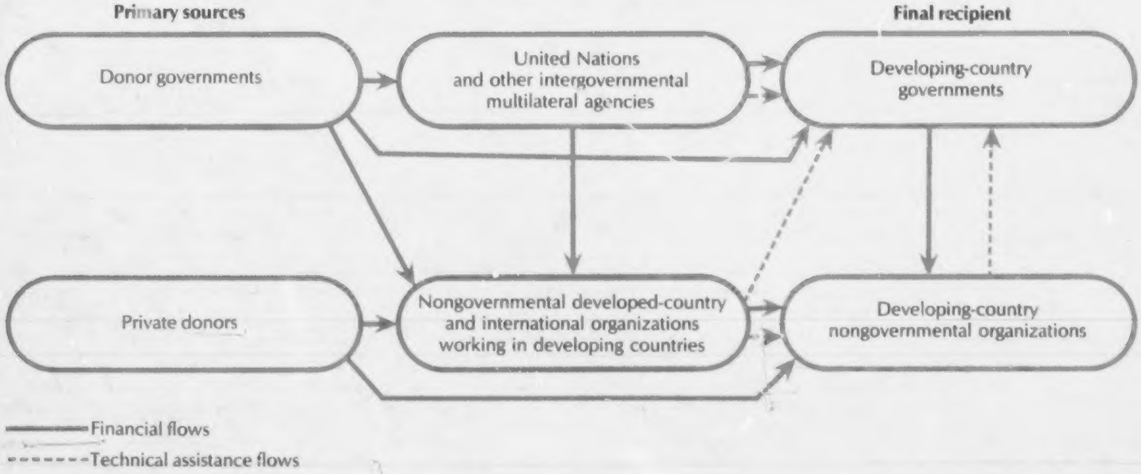
[f] Amounts for Norway 1971–80, Sweden 1975–80, and Japan 1980 include one-fifth of assistance provided through UNICEF, counted as contributions to maternal and child health. In 1980 this amounted to $3.3 million (US) for Norway (190), $7.2 million for Sweden (188), and $1.0 million for Japan (193).

[g] Figures are obligations. Figures for all other countries and organizations are expenditures except Canada 1982, commitments.

[h] All World Bank funds come from national government contributions, but funds are pooled, so that loans in a specific sector, such as population/family planning, cannot be attributed to individual contributing countries. Expenditures are estimated by assuming that annual loan obligations were expended in five equal parts, beginning in the year of obligation and continuing over a 5-year period. For annual obligations of the World Bank, see Table 3.

Source: 1971–80—United Nations Fund for Population Activities (UNFPA). Report on population assistance, 1980. New York, UNFPA, November 1, 1982, except as noted; 1981 and US 1978–80—United States Agency for International Development 1982 (65), except as noted; 1982—Responses from donors to Population Information Program inquiries. Note: All figures are based on donors' responses to inquiries.

Figure 1. Major Channels and Directions of International Population/Family Planning Funding and Technical Assistance


Primary sources
Final recipient
Donor governments
United Nations and other intergovernmental multilateral agencies
Developing-country governments
Private donors
Nongovernmental developed-country and international organizations working in developing countries
Developing-country nongovernmental organizations
Financial flows
Technical assistance flows

Source: adapted from Office of Technology Assessment. World population and fertility planning technologies: the next 20 years. Washington, D.C., U.S. Government Printing Office, February 1982.

were pioneers in the population field. The Ford and Rockefeller Foundations are primarily financial donors. IPPF and the Population Council are primarily operating organizations supporting various field programs and financed by external contributions. In the last two decades they have been joined by many other private organizations wholly or partly dedicated to population/family planning work. Private agencies often work in areas where governments are not yet involved. IPPF, for example, was an early major supporter of community-based family planning programs.

Intergovernmental Grants and Loans

Intergovernmental grant assistance is provided primarily through UNFPA and several other UN agencies (see Table 3). UNFPA derives virtually all of its funds from voluntary contributions by developed-country governments. Also, the Arab League made contributions totaling approximately $9 million in the mid-1970s. UNFPA in turn is the primary source of grant assistance to developing-country governments and also to other United Nations units or agencies such as the UN Population Division, the UN Children's Fund (UNICEF), the International Labour Office (ILO), the Food and Agriculture Organization (FAO), the UN Educational, Scientific and Cultural Organization (UNESCO), the World Health Organization (WHO), and others. Some of these agencies also apply to population activities small and varying portions of their regular budgets from assessed government contributions.

Loan assistance is provided by the World Bank for combined health, nutrition, and population projects as well as for some population education (see Table 3). Since 1970 the World Bank has made loan commitments for $441 million to 13 countries, allowing concessionary terms to the poorest countries through the International Development Association (IDA).

In addition to providing and channeling resources, the intergovernmental organizations, especially UNFPA, have served other important functions: they have stimulated additional funding for population assistance; they have helped to define and draw attention to the problems of rapid population growth; and they have mobilized technical assistance to allow developing countries to help one another (167).

At the same time, some intergovernmental agencies have not moved as rapidly as others in supporting family planning and population activities. In two institutional critiques, Jason Finkle and Barbara Crane suggest that the strong professional orientation of WHO and the World Bank—WHO to health professionals (50) and the World Bank to financiers (35)—limited their commitment and ability to initiate and implement multidisciplinary population/family planning activities effectively. Other reviews of international development assistance note that the procedures of donor governments and international agencies are often cumbersome and time-consuming (174). Still, cooperation among donor agencies, national and international, is increasing as requests for assistance grow in the face of limitations on resources (174).

Little Real Increase in Donor Support

International population assistance from donor governments and private organizations increased over the last decade from about $165 million (US) in 1971 to about $445 million in 1980.

Table 3. Population/Family Planning Assistance Provided Through Intergovernmental Organizations, 1971–1981 (in millions US$)

	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Grants[a]											
UNFPA	8.9	19.8	34.7	57.5	71.2	75.8	72.1	95.6	131.6	147.5	136.5
United Nations[b]	7.0	6.0	8.5 (8.5)	20.8 (14.9)	24.2 (15.9)	28.0 (18.0)	22.7 (14.4)	20.0 (15.3)	24.2 (22.3)	36.8 (34.4)	NA (36.3)
UNICEF	2.4	2.4	3.7 (1.9)	5.8 (5.0)	6.7 (9.3)	6.6 (6.1)	6.7 (5.2)	6.7 (6.1)	9.7 (9.7)	8.6 (8.6)	3.1 (2.7)
ILO	.2	1.0	2.3 (1.9)	3.8 (3.4)	4.9 (3.5)	6.5 (3.1)	6.8 (3.3)	3.7 (3.9)	6.0 (5.9)	6.2 (6.1)	6.5 (6.3)
FAO	.6	.6	1.4 (0.8)	1.5 (1.2)	2.2 (1.8)	1.4 (1.7)	1.4 (2.3)	2.5 (2.3)	3.6 (3.6)	4.0 (4.0)	3.0 (2.4)
UNESCO	.0	.0	2.6 (2.2)	4.1 (3.8)	5.3 (4.9)	4.0 (3.5)	5.0 (3.0)	4.7 (4.0)	4.8 (4.8)	5.7 (5.7)	6.6 (6.3)
WHO[c]	2.8	8.9	16.0 (6.7)	18.9 (11.3)	23.0 (11.7)	29.2 (11.6)	34.7 (11.8)	38.2 (14.2)	40.8 (17.2)	72.1 (20.8)	36[d] (17.2)
Others	5.2	6.6	1.8 (—)	6.2 (—)	6.3 (0.0)	6.3 (—)	6.5 (—)	7.0 (0.0)	7.0 (—)	7.0 (—)	NA (—)
Loans											
World Bank											
Obligations	12.6	34.4	5.0	17.0	40.0	6.8	29.5	33.1	114.0	111.0	12.5
Estimated expenditures[e]	2.9	9.8	10.8	14.2	21.8	20.6	19.7	25.3	44.7	58.8	60.0

— = none

[a] These amounts represent gross expenditures of the listed organizations. UNFPA provides nearly all of the funds expended on population/family planning activities by organizations of the United Nations system. UNFPA contributions to these organizations are shown in parentheses. (Figures for 1971 and 1972 are not available.) Because of differences in reporting procedures before 1979, in some cases the UNFPA contribution appears to exceed the expenditure of the executing agency.

[b] United Nations includes UN Department of International, Economic and Social Affairs Population Division and Statistical Office; UN Department of Technical Cooperation and Development Population Programmes and Projects Branch; UN Commission for Latin America; UN Economic and Social Commission for Asia and the Pacific; UN Economic Commission for Africa; UN Economic Commission for Western Asia.

[c] WHO expenditures for 1971–80 are calculated as half of the WHO biennial family health budget. Thus in any year they may include nutrition, health education, and health statistics.

[d] Source: Kessler, A. and Petros-Barvasian, A. [World Health Organization] Personal communication, November 17, 1982. Figure comprises UNFPA contribution plus budget of Special Programme of Research, Development and Research Training in Human Reproduction; it is not comparable to figures shown for the years 1971–80.

[e] World Bank expenditures estimated by assuming that annual loan obligations were expended in five equal parts, beginning in the year of obligation and continuing over a 5-year period.

Source: United Nations Fund for Population Activities. Report on population assistance, 1980. New York, UNFPA, November 1, 1982, except UNFPA contributions to UN system executing agencies from: UNFPA. Financial report and audited financial statements for the years ending 31 December 1974 through 1981. New York, UNFPA, [1982] and O'Connor, M. [UNFPA]. Personal comunication, January 6, 1983. Also, World Bank loan obligations adapted from: World Bank Annual Reports, 1970–1982 (201–213).

In 1981 the figure declined by about $20 million, to $423 million. Final figures for 1982 are not yet available from all of the major contributors to international population and family planning assistance but are estimated to have risen to about $450 million.

What appears to be more than a doubling in international funds during the 1970s, however, is only a modest increase when the effects of inflation are taken into account (see Figure 2). Measured in constant 1970 dollars, the 1982 figure would be only about $182 million. This amounts to only 10 percent more (in constant value) than the $165 million available in 1971.

Through the 1970s international assistance by major donor governments for population/family planning activities accounted for 1.8 to 2.2 percent of all official development assistance given by 17 countries, including 12 Western European nations, the US, Canada, Japan, Australia, and New Zealand (187,199). In 1980 the percentage fell to less than 1.7—the lowest since the peak in the early 1970s.

Activities Supported by Assistance

International population/family planning assistance supports many different activities. About two-thirds goes to family planning services and contraceptives (163) (see Figure 3). The major activities supported by population/family planning assistance are:

- family planning services and supplies—pilot projects, delivery systems, maternal and child health care and related primary health care, community-based distribution (CBD) of contraceptives and services, social marketing of contraceptives, training of personnel, program administration, management, and evaluation;
- basic data collection—vital statistics, sample surveys, economic and social statistics;
- research—biomedical, demographic, social science, and policy development;
- information, education, and communication—increasing awareness of population problems and family planning services among officials, professionals, and the public.

Some organizations also provide assistance for activities related to:

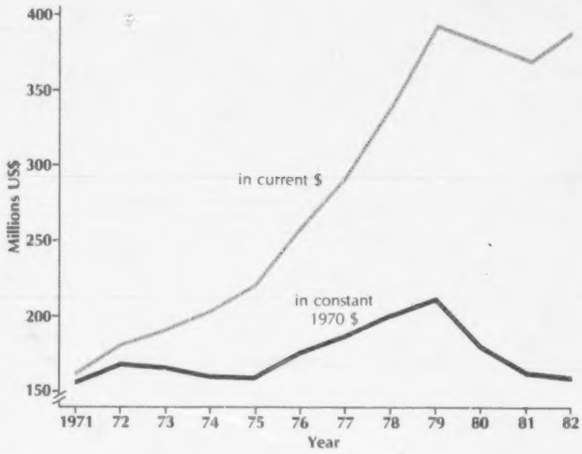
- morbidity and mortality—reduction of maternal and infant morbidity and mortality, improvement of general health and nutrition;
- status of women—integration of women into the development process through the expansion of educational, social, economic, and political opportunities;
- population distribution and internal migration—research, policy development, and service programs concerning rural development, urbanization, regional development, and employment creation (157).

Since 1977 there has been little change in the proportion of population assistance going to each region of the world (160, 167). Asia consistently has received the largest share, followed by Latin America and the Caribbean, Africa, and the Middle East (see Figure 4). Between 1977 and 1979, 39 percent of all external population assistance went to the 13 most populous countries (167). Several agencies, including UNFPA and IPPF, designate certain countries as high-priority countries most urgently needing assistance. These countries then receive a major portion of agency funds (75, 161).

Needs for the Future

Although the amount of population assistance remains limited, the need for increased population/family planning expenditures in the future is evident. One estimate is that in developing countries (excluding China) there are about 350 million fecund women living in union. In order to reach population stabilization, about 80 percent of these women would need to be contracepting. Since only about 20 percent are now contracepting, at least a fourfold increase in expenditures—or a total expenditure of about $3,700 million—would be necessary to achieve a contraceptive prevalence rate of 80 percent, other things being equal. If the donor agencies' share of expenditures were unchanged, these organizations would need to contribute about $1,700 million rather than the current figure of $423 million (146).

Figure 2. International Population/Family Planning Grant Assistance from Major Donors, in Current and Constant US Dollars, 1971–1982



Note: Based on Table 2. Excludes loans made by the World Bank.

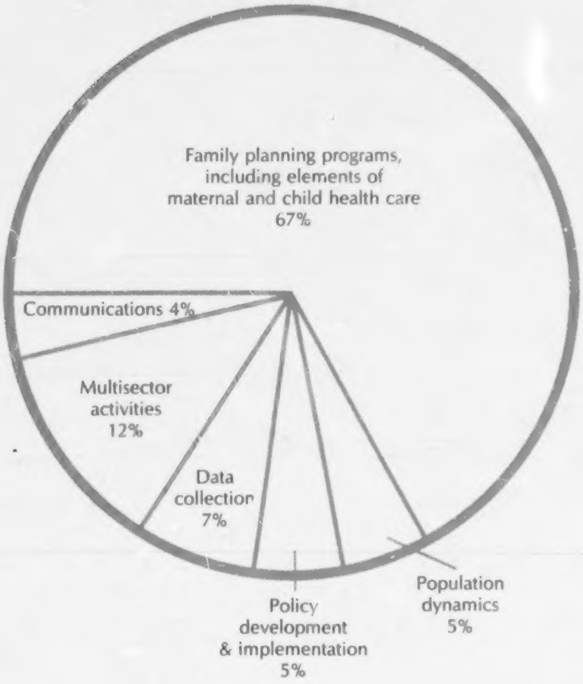
This, of course, is a minimum estimate of costs. Reaching more and more couples, especially in rural areas where transportation and communication are poor, may be increasingly costly on a per-user basis. Furthermore, the population of fecund women will grow by two-thirds between 1980 and 2000 (see Figure 5). Thus increasing expenditures will be necessary even to maintain the same percentage levels of contraceptive use.

An estimate such as this must be very approximate. Nonetheless, it suggests the magnitude of the growing need both for population assistance through donors and for national commitment to the operation and expansion of family planning programs.

NATIONAL GOVERNMENTS

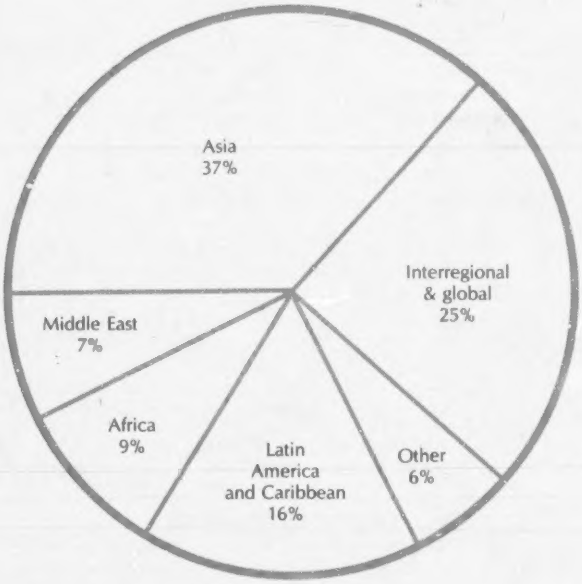
National governments currently provide the bulk of international assistance for population/family planning. The major contributors are about a dozen nations, including the United States, Japan, a number of western European countries, Australia, and New Zealand. Most government contributions go through UNFPA and IPPF, but some countries also provide assistance bilaterally. Generally, assistance from governments is available for the broadest range of population/family planning

Figure 3. Types of Activities Supported by International Population/Family Planning Assistance, 1980



Source: United Nations Fund for Population Activities. Report on population assistance, 1980. New York, UNFPA, November 1, 1982.

Figure 4. Regional Distribution of International Population/Family Planning Assistance, 1980



Note: "Other" = certain administrative costs

Source: United Nations Fund for Population Activities. Report on population assistance, 1980. New York, UNFPA, November 1, 1982.

activities (see Table 4, pp. J-638-639). In most cases the figures reported below for fiscal years 1981 and 1982 were provided directly by the agencies involved in answer to a written inquiry from the Population Information Program. They are not necessarily consistent with the expenditure figures for 1971–80 shown on Table 2.

United States

Through the **United States Agency for International Development (US AID)**, the US is the single largest provider of international population assistance. In fiscal year 1982 (October 1, 1981, through September 30, 1982), US AID provided $211 million for population/family planning activities, a slight increase over the amount of about $185 million provided each year from 1979 through 1981 (65). The same amount—$211 million—has been appropriated for fiscal year 1983. This sum amounts to almost one-half of all international population assistance. Between 1965, when the program began, and 1982, US AID obligated $1,939 million for population assistance. In recent years population/family planning assistance has accounted for between 4 and 5 percent of all economic assistance provided by US AID (64).

The US AID population program provides:

1. bilateral assistance directly to developing-country governments;
2. multilateral assistance, primarily to the United Nations Fund for Population Activities (UNFPA), the International Planned Parenthood Federation (IPPF), and the World Health Organization (WHO); and
3. multicountry assistance—that is, assistance provided through US-based nongovernmental organizations for work in a number of developing countries (see Figure 6).

Multilateral and multicountry assistance is administered primarily through the Office of Population; bilateral assistance, through each country mission with the support of one of the four regional bureaus in Washington. (US contributions to the World Bank are authorized separately by Congress.) Support is provided for a wide range of population/family planning activities. In family planning programs, aid is given only for voluntary programs that permit a choice of family planning methods (198). Support for abortion is prohibited. Most assistance is in the form of grants and contracts, but some loans have been negotiated.

The 1982 funds were allocated approximately as follows:

- 67 percent for family planning services including purchases of contraceptives;
- 11 percent for training and institution-building;
- 7 percent for biomedical, epidemiologic, and operations research;
- 6 percent for demographic analysis and evaluation;
- 5 percent for population and family planning information and education activities;
- 4 percent for population policy research and dissemination (166).

Asia receives the largest share of US AID population assistance. Bangladesh, India, and the Philippines received the largest amounts between 1965 and 1982 (167).

Current major interests of US AID are: operations research to evaluate various service delivery systems; training of paramedical personnel; family planning information and education programs; integration of population, health, and nutrition in cost-effective community-based programs; the impact of socioeconomic factors on fertility; and statistical systems to measure acceptance of family planning and changes in fertility (157).

Distribution of contraceptives is an important element of US AID assistance. US AID is the chief supplier of contraceptives to developing-country family planning programs, using competitive bulk procurements to obtain them at low prices (167). In 1982 US AID purchases of contraceptives amounted to approximately $38 million (63). This amount made possible the purchase of about 126 million cycles of oral contraceptives, 1.5 million IUDs, 2.3 million gross of condoms, and smaller quantities of spermicides.

Support through Private Organizations

US AID presently is providing total or primary support for a number of private organizations and university programs that work in many developing countries. These institutions include the Association for Voluntary Sterilization (AVS), the Battelle Memorial Institute, Columbia University, Development Associates, Family Health International (FHI), Family Planning International Assistance (FPIA), the Futures Group, the Johns Hopkins University, the Johns Hopkins Program for International Education in Gynecology and Obstetrics (JHPIEGO), the Pathfinder Fund, the Population Council, the Program for Applied Research in Fertility Regulation (PARFR), and the Research Triangle Institute (RTI) (167) (see pp. J-640–645).

Applications for assistance should be submitted to the appropriate private agency, to the Director of the US AID Mission in the applicant country, or, if there is no US AID Mission, to the US Ambassador at the US diplomatic mission. Applications may also be sent directly to:

Director
Office of Population
Bureau for Science and Technology
Agency for International Development
Washington, D.C. 20523, USA

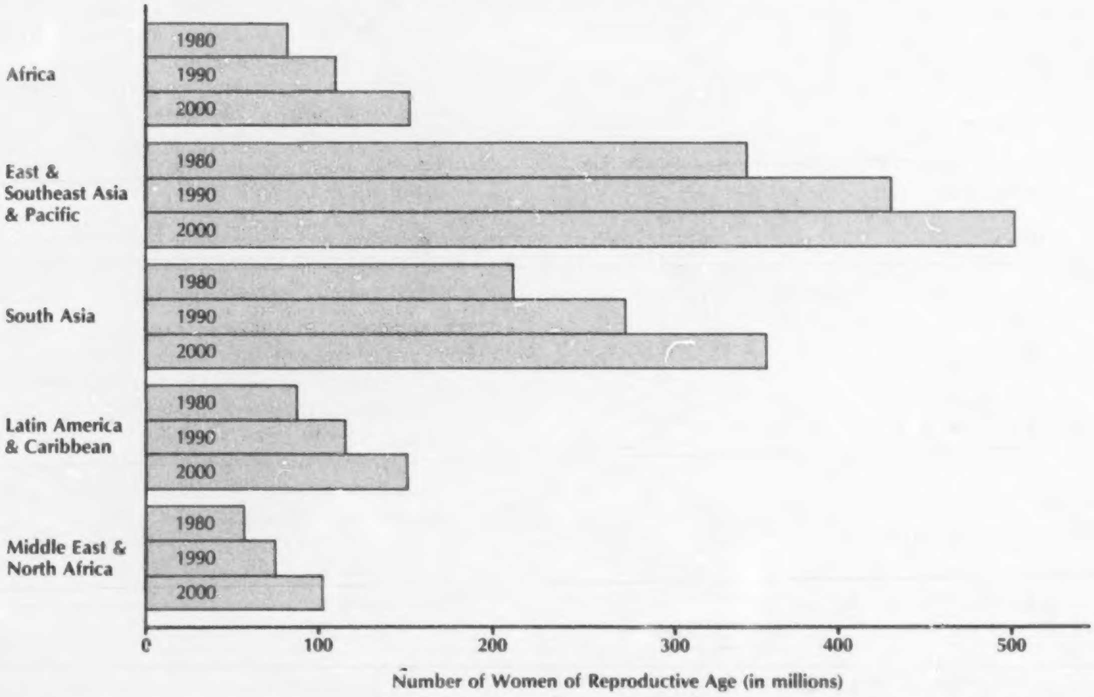
Other US Government Agencies

Other US government agencies, working largely with US AID funding, also provide various types of international assistance:

The **Centers for Disease Control (CDC), Division of Reproductive Health**, provides technical assistance and training in basic data collection; demographic, social science, survey, and biomedical research; family planning project management, including logistics and inventory management; and reproductive health epidemiology. Chief areas of current interest are contraceptive prevalence surveys, community-based and other distribution systems, family planning records systems, patient-flow analysis, and safety of fertility control and human reproduction (160). Assistance is available to governments and to private and international agencies working in developing countries (157).

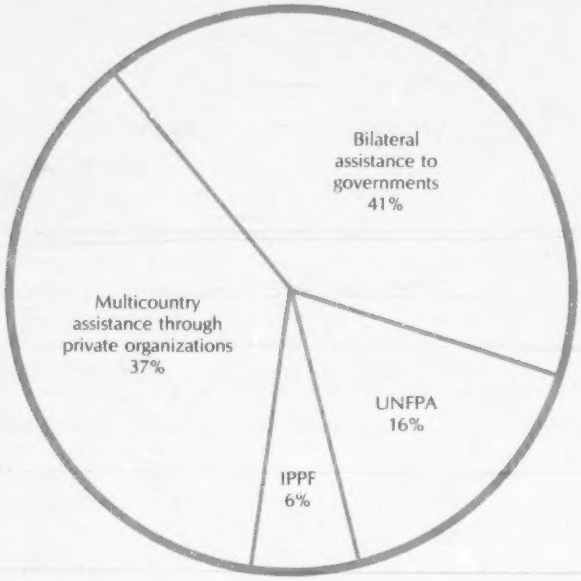
Some $1.3 million per year is budgeted for population activities in fiscal years 1982 and 1983, funded by US AID (144). In addition, in fiscal year 1982 the Ford Foundation provided CDC with $75,000 for work in international reproductive health epidemiology. Also, the Rockefeller Foundation continues to support, as part of a 5-year, $400,000 grant, two fel-

Figure 5. Estimated Number of Women of Reproductive Age (15–49 Years) in Developing Regions, 1980, 1990, and 2000



Source: United Nations (UN). Department of International Economic and Social Affairs. Population Division. World population and its age-sex composition by country: 1950–2000: demographic estimation and projection as assessed in 1978. New York, UN, January 2, 1980.

Figure 6. Forms of Population/Family Planning Assistance Provided by the US Agency for International Development, 1982



Source: US Agency for International Development 1982 (63)

lowships each year in the epidemiology of family planning and human reproduction (144). Other CDC activities are undertaken in collaboration with the World Health Organization (WHO). Requests for assistance should be sent to the Office of Population, US AID, in Washington, D.C.; the appropriate US Embassy or US AID Mission; or

Director
Division of Reproductive Health
Centers for Disease Control
1600 Clifton Road, N.E.
Atlanta, Georgia 30333, USA

The **International Statistical Programs Center of the US Bureau of the Census** helps developing-country agencies improve data collection and analysis. The Bureau provides short- and long-term training in survey and census methods for statisticians and in-country assistance with other basic data collection procedures, data processing, demographic research, and social science research. These services are funded by US AID, United Nations organizations, the World Bank, and governments requesting assistance (157). Applications for assistance should be submitted to the US AID Mission or US Embassy in the applicant country; to US AID in Washington, D.C.; or to the:

Chief
International Statistical Programs Center
US Bureau of the Census
Washington, D.C. 20233, USA

The **National Center for Health Statistics (NCHS)** conducts the Vital Statistics Improvement (VISTIM) Program to help upgrade national vital registration systems. VISTIM, in conjunction with consultants from the Association for Vital Registration and Health Statistics (a US organization of state and local officials in vital and health statistics programs), collaborates with host-government agencies to evaluate and improve existing birth and death registration systems and to develop and test new systems (82). NCHS expenditures on these activities were $381,000 in 1981 and $133,300 in 1982, funded by the US AID Office of Population and US AID country missions (82). The estimated budget for 1983 is $150,000 (117). Requests for assistance should be sent to:

Assistant Secretary for Health
Office of International Health
US Department of Health and Human Services
3700 East-West Highway
Hyattsville, Maryland 20782, USA

Japan

Japan has provided international population assistance since 1969. Total population assistance in 1982 was approximately $42.6 million (83), or about 9 percent of worldwide population assistance. This is an increase of almost $11 million from 1981. Japan is the second largest governmental donor of international population assistance.

The Japanese government, which supports virtually all population activities except abortion services, distributes over 90 percent of its population aid multilaterally, through the **Ministry of Foreign Affairs** (157). Multilateral assistance goes chiefly to UNFPA ($21 million in 1981) and IPPF ($8 million in 1981) (157). About 4 percent of the multilateral assistance to UNFPA and IPPF is then transferred to the Japanese Organization for International Cooperation in Family Planning (JOICFP), a private agency with which the Japanese government works closely (see p. J-643) (83).

Bilateral aid, in the form of technical assistance, is given to governmental agencies through the **Japan International Cooperation Agency (JICA)**. This assistance concentrates on family planning projects associated with maternal and child health care programs in Asian countries (157, 173). For example, Japanese bilateral assistance has recently provided or is providing equipment and supplies to information, education, and communication projects in Bangladesh, China, Indonesia, the Philippines, and Thailand. Future bilateral assistance may go to Latin America and other regions (83). Applications should be submitted to the Ministry of Foreign Affairs through the Embassy of Japan in the applicant country.

Japan International Cooperation Agency
2-1, Nishi-Shinjuku
Shinjuku-ku
Tokyo, Japan

Norway

In 1971 the Norwegian Parliament decided to allocate about 10 percent of all Norwegian development aid to population activities, including maternal and child health care—a larger portion than any other country allocates (59). The 1981 budget for population activities was NKr 155.3 million, or approximately $27 million, which accounted for about 7 percent of all international population funding (120). The 1982 budget was NKr 161.5 million, or approximately $25 million (120). In terms of population assistance per capita, Norway ranks highest among donor countries (59), contributing about $6.00 per person.

Norway supports many population activities. Priority goes to assistance for health and family planning infrastructure, especially in rural areas, and for personnel training (157). A wide range of other activities, including projects to improve the status of women, also receive Norwegian aid (157).

About three-quarters of Norwegian aid is given multilaterally to intergovernmental and nongovernmental organizations through the **Royal Norwegian Ministry of Foreign Affairs** (157). In 1981 Norway gave NKr 111.3 million, or about $19.4 million, for multilateral programs (120). This sum included $1.5 million contributed to a multi/bilateral trust fund created with UNFPA (157), in which Norway provides funding and UNFPA implements the project. Such aid helped support family planning and other health projects in Nepal, Sri Lanka, Thailand, Jamaica, and Peru (160). In 1982 Norway contributed about NKr 127.0 million, or $19.7 million, in multilateral population assistance (120).

Bilateral population aid to other governments or to projects sponsored by Norwegian nongovernmental organizations is provided through the **Norwegian Agency for International Development (NORAD)**. NORAD gave NKr 44 million, or about $7.7 million, in bilateral population assistance in 1981 (120, 157) and about NKr 34.5 million, or $5.3 million, in 1982 (120). Although most other bilateral development aid is directed to a limited number of countries with which Norway has revolving cooperation agreements, family planning assistance is not restricted in this way (157, 173). NORAD recently has given direct population assistance to Bangladesh, Botswana, India, and Kenya (114, 115, 116).

Applications for bilateral assistance should include information on project components, objectives, time schedules, and financing. They should be submitted to:

NORAD
Boks 8142 Oslo Dep.
Oslo 1, Norway

Sweden

In 1958 Sweden donated funds to a Sri Lankan family planning project. Thus it became the first developed country to provide family planning assistance to the developing world (167). Currently Sweden is the fourth largest international donor, after the US, Japan, and Norway, contributing about 5 percent of total population assistance. In terms of population assistance per capita, Sweden ranks second, after Norway. In 1982 Sweden contributed SKr 127 million, or $22.7 million, to population activities (110).

Almost 90 percent of Swedish assistance, which covers all aspects of population and family planning, is provided multilaterally through the **Ministry of Foreign Affairs** (157). In 1982 Swedish multilateral assistance totaled SKr 110 million, or $19.7 million, comprising contributions of SKr 45 million ($8.0 million) to UNFPA, SKr 40 million ($7.1 million) to IPPF, and SKr 25 million ($4.5 million) to the WHO Special Programme of Research, Development and Research Training in Human Reproduction (110).

The rest of Swedish population assistance is given bilaterally through the **Swedish International Development Authority (SIDA)**. While early population assistance concentrated on traditional family planning programs, SIDA now requires that population programs receiving aid be part of larger social development and welfare efforts (173). In 1982 bilateral assistance totaled SKr 17 million, or $3.0 million (110). Bilateral aid was concentrated on a small number of countries, including Bangladesh, Kenya, and Sri Lanka. Sweden has long-term bilateral cooperation agreements with these countries (157).

Applications for bilateral assistance should be submitted to SIDA by the Ministry of Planning of the applicant country 18 months before the proposed date of implementation.

Swedish International Development Authority
Birger Jarlsgatan 61
S 105 25 Stockholm, Sweden

Federal Republic of Germany

The Federal Republic of Germany has provided population assistance, through the **Federal Ministry for Economic Cooperation**, since 1969. In 1981 West German expenditures were about DM 51.8 million, or $22.9 million. This amounted to over 5 percent of all international population assistance. In 1982 estimated expenditures were more than DM 53.3 million, or $21.9 million (49).

West German assistance supports a broad range of population activities, primarily through multilateral channels. In 1982 West Germany contributed about $13.3 million to UNFPA, about $2.4 million to IPPF, and about $500,000 to the WHO Special Programme of Research, Development and Research Training in Human Reproduction. Bilateral assistance in 1982 is estimated at about $5.8 million (49). Most bilateral aid has been given for specific projects rather than for general program support (173). Currently West Germany is providing assistance to Bangladesh, Kenya, and a regional project in the Caribbean (157). Requests for assistance should be sent to the Federal Ministry for Economic Co-operation in Bonn via the Embassy of the Federal Republic of Germany in each country.

Federal Ministry for Economic Cooperation
Government of the Federal Republic of Germany
Karl Marx Strasse 4-6
P.O. Box 120 322
5300 Bonn 1, Federal Republic of Germany

United Kingdom

In 1964 the United Kingdom (UK) made a commitment to support population activities throughout the world. Through the Health and Population Division of the **Overseas Development Administration (ODA)**, the UK now strives to incorporate a population component into all suitable new development projects (123). ODA expenditures for population were estimated at £11.3 million, or $19.8 million (US), in 1982 (44). This is a substantial increase over the amount of £6.5 million, or $13.1 million, in 1981.

Population and family planning activities, including contraceptive manufacture, women's programs, and efforts to improve population distribution, are supported through both multilateral and bilateral channels (157). The majority of British population assistance—77 percent in 1981—consists of grants to multilateral agencies. In 1981 ODA gave a total of £5 million, or $10.0 million, to UNFPA, IPPF, and the WHO Special Programme of Research, Development and Research Training in Human Reproduction. Bilateral aid, which accounted for 15 percent of UK population assistance in 1981, goes to requesting developing-country governments and organizations. In 1981 ODA contributed £1 million, or $2.0 million, in bilateral aid to 12 countries and two regional organizations (122). Although in the past bilateral aid was given primarily within the Commonwealth, recently the UK has assisted a growing number of non-Commonwealth countries (173).

In addition to assistance through regular multilateral and bilateral channels, ODA supports population activities in other ways, including support of British institutions involved in international population activities and personnel training; grants to voluntary agencies working in developing countries; grants for population research in areas such as demography, family planning, socioeconomic development, and health management; and grants for conference and meeting costs (123). These activities accounted for about 8 percent of UK population/family planning assistance in 1981.

In Rio de Janeiro, Brazil, a family planning worker shows young mothers a variety of family planning methods, including spermicide. Her activities are part of a community-based distribution (CBD) project carried out by the Centro des Pesquisas de Assistência Integrada à Mulher e à Criança (CPAIMC). The CBD project is funded by US AID through the Johns Hopkins Population Center. US AID has pioneered and funded CBD programs as well as a broad range of other family planning activities. (Courtesy of Maria J. Wawer)

A government seeking assistance from the UK should apply to the British High Commission or Embassy in the country. Non-governmental organizations should apply directly to:

Overseas Development Administration
Bilateral Coordination Department
Eland House
Stag Place
London SW1, UK

The Netherlands

In 1982 the Netherlands, through the **Ministry of Foreign Affairs**, provided approximately $13.2 million in population assistance, or about 3 percent of international population assistance (138). The Netherlands has gradually phased out all bilateral assistance for population projects and now provides its support through UNFPA and IPPF (157). In 1980 the Netherlands contributed $15.3 million to UNFPA, of which $1.5 million was earmarked for IPPF (157). Under multi/bilateral arrangements with UNFPA, the Netherlands recently has assisted population projects in Nepal and Bangladesh (157). Inquiries should be sent to:

Ministry of Foreign Affairs
Plein 23
The Hague, Netherlands

Canada

The Government of Canada, through the **Canadian International Development Agency (CIDA)**, began providing population and family planning assistance in 1970, after legislation was enacted to allow the dissemination of contraceptive information and services in Canada (157). In 1981 Canada's population assistance totaled about Can$12.0 million, or $10.0 million (US), and in 1982 estimated commitments were Can$14.4 million, or $11.7 million (112). These amounts do not include funding for population-related activities of the International Development Research Centre (see below).

Current priorities for CIDA in the population field are family planning and maternal and child health as part of primary health care. Aid is given for virtually all kinds of population activities including those directed at the status of women, population distribution, and internal migration (157). About 90 percent of CIDA population assistance is given multilaterally (157). In 1981 CIDA contributed over $6.0 million (US) to UNFPA and over $3.0 million to IPPF (112, 161). Bilateral aid is concentrated on a limited number of countries, primarily in Asia (157). Major recipients of bilateral aid in 1981 were Bangladesh, Thailand, and Brazil (160). Applications for assistance should be channeled through the Head of the Canadian Mission in the applicant country. They should be addressed to the First Secretary at the CIDA mission or to the planning officers at the country desk of CIDA headquarters:

Canadian International Development Agency
200 Rue Principale
Hull, Quebec K1A OG4, Canada

The **International Development Research Centre (IDRC)** is a public corporation funded annually by the Canadian Parliament to support research, mostly benefiting the developing world (70). In fiscal year 1982 the amount budgeted for population-related activities was Can$1.7 million, or $1.4 million (US), in the Health Sciences Division and Can$1.9 million, or $1.6 million (US), in the Social Sciences Division, for a total of Can$3.6, or $3.0 (US) (103). Between 1970 and 1982 IDRC provided an average of Can$153,000 each, or $146,000 (US), for 1,400 projects in all fields (69). A substantial number of these projects involved contraceptive methods, family-planning research, maternal and child health care, or demographic research (69). Additional projects, such as information science activities, included population-related components (69). Applicants for assistance should submit a draft proposal including a tentative summary budget to one of the IDRC regional offices (for addresses, see p. J-649) or to:

Director, Health Sciences Division
or
Director, Social Sciences Division
International Development Research Centre
P.O. Box 8500
Ottawa K1G 3H9, Canada

Denmark

The Government of Denmark provides development assistance through the **Danish International Development Agency (DANIDA)**, which contributed approximately $7.8 million in population assistance in 1982 (133).

Assistance, primarily through multilateral channels, goes to all types of population activities including those involving the status of women and population distribution (157). In 1982 Denmark provided $6.7 million in multilateral contributions, compared with $7.8 million in 1980 and $7.3 million in 1981 (133). The 1982 contribution included $4.5 million to the general budget of UNPFA and $1.4 million to the general budget of IPPF (133). Additionally, as part of multi/bilateral arrangements with these organizations, in 1982 Denmark provided $927,000 to Bangladesh through UNFPA and $150,000 to India through IPPF. From 1982 to 1985, DANIDA also will contribute to an integrated rural health and family planning project in Kenya (133).

Requests for assistance should be sent to DANIDA or, in Bangladesh, India, Kenya, Tanzania, Vietnam, and Zambia, to the DANIDA Development Assistance Mission on the embassy grounds.

DANIDA
Ministry of Foreign Affairs
Asiatisk Plads 2
1448 Copenhagen K, Denmark

Australia

The government of Australia, through the **Australian Development Assistance Bureau (ADAB)**, aids population-related efforts as part of its support for multipurpose programs (157). In fiscal year 1982 ADAB provided approximately $A 3.9 million, or $4.0 million (US), in population assistance, an increase of about $800,000 (US) over the previous year (183).

ADAB gives about one-third of its population aid multilaterally and about two-thirds bilaterally, primarily to Asian countries. In fiscal year 1982 about $A 1.5 million, or $1.5 million (US), went to UNFPA. Bilateral aid, totaling about $A 2.4 million, or $2.4 million (US), went to Bangladesh, Indonesia, Malaysia, the Philippines, Singapore, and Thailand (183). In addition to this financial assistance, ADAB has given technical assistance with data collection, data analysis, and demographic research to a number of countries in Southeast Asia and the South Pacific (157). Requests for assistance should be sent to ADAB through the appropriate Australian mission or, from countries that have no mission, directly to:

Australian Development Assistance Bureau
P.O. Box 887
Canberra City, A.C.T. 2601, Australia

Switzerland

Swiss population assistance is given entirely in contributions to UNFPA through the **Directorate of Development Cooperation and Humanitarian Aid**, Federal Department of Foreign Affairs (118). Swiss contributions to UNFPA rose steadily from $500,000 in 1977 to $1.8 million in 1980 (see Table 2). In 1981 Switzerland contributed $1.4 million to UNFPA (161).

Directorate of Development Cooperation and
Humanitarian Aid
Federal Department of Foreign Affairs
Palais Federal
Eigerstrasse 73
CH 30003 Bern, Switzerland

Belgium

Belgium supports population activities through the **Administration Générale de la Co-opération au Développement (AGCD)**, the official agency for all development assistance. In 1980 AGCD contributed BF 48.0 million, or about $1.6 million, for population activities. In 1981 contributions decreased to BF 33.0 million, or $825,000 (98).

Aid goes primarily for basic data collection, maternal and child health care with a family planning component, and information and education (157). Most population aid is given through multilateral channels, primarily to UNFPA ($1.1 million in fiscal year 1980 and $650,000 in fiscal year 1981) (98). The rest is given bilaterally to governments with which Belgium has technical cooperation agreements or to the agencies they designate. Since 1975 bilateral aid has gone to a number of African countries, including Senegal, Tunisia, and Zaire (157). Re-

Difficulties of Estimating Population Assistance

It is difficult to estimate the total amount of assistance going to population/family planning activities around the world. A number of problems arise:

- International assistance can be tabulated in several different ways—by donors' budgets; by donors' obligations, either on a single- or multiyear basis; by donors' expenditures; or by recipient-country expenditures. Totals for each year may vary depending on the method used. For example, the major government donors and private funding organizations report total expenditures for 1980 of about $380 million, while reports from the same sources of expenditures by country add up to about $500 million (162).
- Assistance may be in the form of either loans or grants. With loans, disbursements or expenditures usually are scheduled over a 3- to 5-year period, but frequently are extended. Between 1970 and 1982, for example, World Bank loan obligations totaled about $441 million, but as of October 1982 disbursements totaled only about $170 million. Some donor governments also make loans, but these loans are included with grants in donor totals of population assistance.
- Reports of current government expenditures on national family planning programs are not readily available for many countries. When figures are provided, governments may calculate them differently depending on definitions of family planning; calculations of local, in-kind, or capital contributions; and timing of obligations, expenditures, or fiscal years.
- Because some programs combine family planning with other health care, particularly maternal and child or primary health care, it is difficult to determine how much is actually spent on family planning. Some countries do not want to report family planning and health expenditures separately because of a philosophical commitment to integrated programs. For example, Sweden, Norway, and Japan, at least in some years, have reported one-fifth of contributions to UNICEF as going to maternal and child health and therefore a part of population/family planning assistance (see Table 2). UNICEF, however, does not consider portions of these countries' contributions to be specifically for population/family planning activities (185).
- A number of private foundations and individuals make contributions that are not reported in surveys of donors. These contributions have probably totaled no more than $25 million annually.
- Because of changing currency exchange rates, trends reported in US dollars may not accurately reflect actual trends when expressed in the currency of other donor governments. For example, between 1981 and 1982, Australian contributions to population/family planning, measured in Australian dollars, rose from $A 2.8 million to $A 3.9 million, an increase of 41 percent (183). When converted to US dollars, however, the increase appears to be only 20 percent.

quests for assistance should be directed to the Embassy of Belgium in the applicant country.

Administration Générale de la Co-opération au
Développement
Place du Champs de Mars
Marsveldplein 5, Box 57
1050 Brussels, Belgium

Finland

Through the **Department for International Development Cooperation** in the Ministry for Foreign Affairs, the Government of Finland has assisted developing-country population programs since 1969. In 1980 Finnish population/family planning assistance totaled $1.5 million (163).

Finland supports various population activities through multilateral and bilateral channels. In 1981 Finland gave $548,000 to UNFPA (160). Bilateral assistance has supported population-related activities in a small number of countries, designated as "program countries," with which Finland has formal assistance agreements (51, 157). Recently Finland has made grants to projects for rural health care, primary health care, and maternal and child health care in Egypt, Kenya, Nicaragua, Somalia, Sri Lanka, Tanzania, and Zambia. The value of these multiyear grants has ranged from about $100,000 to $2.7 million each (160).

Requests for assistance can be made through official government agencies in the applicant country or through yearly programming sessions involving program countries and international organizations. Requests should be sent to the Finnish Embassy in the applicant country or to:

A woman receives a month's supply of oral contraceptives at a family planning center in El Salvador. About two-thirds of all international assistance for population/family planning activities goes to provide services and supplies to users of family planning. Most international aid comes from a dozen developed countries. (US AID)

Ministry for Foreign Affairs
Department for International Development Cooperation
Erottajankatu 19B
00130 Helsinki 13, Finland

New Zealand

New Zealand, through the **Ministry of Foreign Affairs,** provides population assistance primarily by way of contributions to multilateral agencies (157). In 1981 New Zealand contributed a total of $700,000 to UNFPA and IPPF (157).

Ministry of Foreign Affairs
Private Bag
Wellington, New Zealand

INTERGOVERNMENTAL AGENCIES

Two intergovernmental agencies provide major population/family planning assistance—the United Nations Fund for Population Activities (UNFPA) and the World Bank. UNFPA is the principal source of grant assistance to government programs. UNFPA has made grants totaling more than $900 million from 1969 through 1982. The bulk of these grants go through other UN agencies for international activities or for technical assistance that they provide to governments. Some of these UN agencies also provide population/family planning assistance from their regular budgetary funds. The World Bank has made loan obligations for population/family planning totaling about $441 million from 1970 through 1982. These loans are disbursed over periods that may extend as long as eight or nine years. World Bank loans usually emphasize development of infrastructure and construction of facilities for integrated health and family planning programs.

The **United Nations Fund for Population Activities (UNFPA)** is both the principal recipient of population funds from donor governments and the principal multilateral source of population assistance to governments. It has provided grants to assist 139 developing countries and territories. Established by the Secretary-General in 1967 as a trust fund, UNFPA became operational in 1969, was placed under the authority of the General Assembly in 1972, and was affirmed as a subsidiary organ of the United Nations General Assembly in 1979 (157). Subject to policy guidance by the Economic and Social Council (ECOSOC), UNFPA has as its governing body the Governing Council of the United Nations Development Programme (150).

From its operational start in 1969 through 1982, UNFPA program expenditures totaled more than $900 million. In the recent past, annual expenditures declined slightly from $147.5 million in 1980 to $136.5 million in 1981. The figure for 1982 is estimated at under $135 million. Although as many as 130 governments have contributed to UNFPA, the bulk of support has come from 12 major donors: the United States, Japan, West Germany, the Netherlands, Norway, Sweden, Canada, the United Kingdom, Denmark, Switzerland, Belgium, and Australia, listed in order of the size of cumulative contributions through 1981.

UNFPA supports a core program of population activities that includes assistance for family planning, population communication and education, and basic data collection and analysis as well as population policy formulation, implementation, and evaluation. The Governing Council has approved a set of criteria for the identification of high-priority countries for population assistance and has also decided that, as a goal, two-thirds of country program funds should be devoted to projects in high-priority countries. In 1982 the criteria for the determination of high-priority countries were modified slightly, and the list was expanded to 53 countries from the original 40.

At the end of 1981 UNFPA was supporting 1,786 projects—1,303 country projects, 202 regional, 90 interregional, and 191 global projects (161). Although responsibility for implementing projects and programs at the country level rests chiefly with the recipient government, projects normally are executed by the country itself or given technical support through the appropriate agency of the United Nations system or through an accredited international nongovernmental organization (157).

About one-third of all UNFPA assistance has been allocated to activities in the Asia and Pacific region. Within that region, about two-thirds has been used for family planning projects. In sub-Saharan Africa—where basic population data are lacking—support has been directed primarily to census work and to institution building. In recent years, however, maternal and child health and birth spacing programs have received increasing shares of the funding in the region. Over the years UNFPA assistance to the Middle East and North Africa has focused on maternal and child health and family planning and on basic data collection. While assistance to Latin America and the Caribbean was originally concentrated on data collection and demographic analysis, it soon shifted to family planning, through the health sector and through community development programs, and to communication and education programs, through formal education programs and through extension programs, including those for women and youth groups.

Overall, family planning programs, some of which include substantial support for maternal and child health services, continue to receive the largest single share of UNFPA allocations. The cumulative share for the period 1969–81 was just under 45 percent. The share for communication and education programs was 13 percent; for basic data collection, 17 percent; for population research and demographic training, 9 percent; for policy formulation, 5 percent; and for multisector activities, 11 percent.

Requests for assistance should follow a format established by UNFPA. All government requests should be submitted through the UNDP Resident Representative in that country. Other inquiries should be submitted to the Executive Director. UNFPA has 33 field representatives, with the official title of Deputy Representative and Senior Advisor on Population. There are now 13 UNFPA Deputy Representatives and Senior Advisors on Population in countries in the Asia and Pacific region; 11 in sub-Saharan Africa; 5 in the Middle East and North African region; and 4 in Latin America and the Caribbean region.

Executive Director
United Nations Fund for Population Activities
220 East 42nd Street
New York, New York 10017, USA

Within the United Nations Secretariat, the **Population Division** of the Department of International Economic and Social Affairs and the **Population Programmes and Projects Branch** of the Department of Technical Cooperation also provide population/family planning assistance to developing-country governments. The Population Division conducts research and analyses at the global level on population trends and the interrelationships of population and social and economic development, sponsors international conferences and expert group meetings on various subjects, issues publications on a variety of aspects of population phenomena including fertility and family planning, and assists governments to formulate, implement, and evaluate their population policies (108, 148). For 1982–83 the Population Division has a budget of about $6.4 million, of which about $2.5 million is provided by UNFPA (197). The Population Programmes and Projects Branch provides direct technical assistance to countries in establishing population units within planning agencies of national governments, in conducting demographic analysis, and in drawing up population policy (108). Recently the budget for these activities has been about $25 million annually (118). Most technical assistance activities are funded by UNFPA (173). Requests for assistance from either unit should be submitted to the UNDP representative in the applicant country.

In a village in India, a doctor working with a family planning institute examines a child. Increasingly, family planning activities supported by the major intergovernmental organizations—UNFPA and the World Bank—are combined with other health programs. (UN)

The **UN Regional Commissions**, whose purpose is to assist economic development in their respective geographic areas, support a variety of population-related activities. There are five Regional Commissions:

- Economic Commission for Africa (ECA),
- Economic and Social Commission for Asia and the Pacific (ESCAP),
- Economic Commission for Western Asia (ECWA),
- Economic Commission for Latin America (ECLA),
- Economic Commission for Europe (ECE).

During 1980 and 1981 UNFPA provided about $6.5 million annually to the five Regional Commissions for their technical assistance, training, and other population-related activities (161).

UN Regional Demographic Training and Research Centres in Cameroon, Ghana, India, and Chile are managed by their respective Regional Commissions. Such centers in Egypt and Rumania are managed by the UN Population Programmes and Projects Branch. The Population Division manages the Interregional Training and Research Programme in Population and Development in the Soviet Union.

Requests for assistance from ECA, ESCAP, ECLA, and ECE and from the Training and Research Centres should be sent directly to them (for addresses, see p. J-649). Requests for assistance from ECWA should be sent through the UNDP Resident Representative in each country to the Executive Secretary of the Regional Commission.

The **United Nations Children's Fund (UNICEF)** is involved in population activities indirectly as part of its effort to assist governments and parents to meet the basic needs of children (153). In 1967 its maternal and child health program was expanded to include assistance in responsible parenthood and family planning, and in 1970 population information, education, and motivation were added (157). This assistance is provided as part of aid to integrated maternal and child health, nutrition, education, and welfare projects. When requested, UNICEF buys contraceptive supplies and equipment for family planning programs and is reimbursed by the country or agency (153).

In 1981 UNICEF support for family planning as a form of maternal and child health care was $1.2 million, of which about $835,000 was allocated by UNFPA as funds-in-trust. UNFPA provided an additional $1.9 million for the purchase of contraceptives, supplies, and equipment essential for family planning and staff support services (87). Inquiries should be sent to:

Senior Policy Specialist, Women's Activities Section
United Nations Children's Fund
866 United Nations Plaza
New York, New York 10017, USA

The involvement of the **International Labour Office (ILO)** with population issues stems from recognition of the effect of rapid population growth in developing countries on issues that are of special concern to workers. The ILO Population and Labour Policies Programme has three main components: the promotion and integration of population education and family welfare elements into the work setting, the dissemination and application of research on the relationship between economic and demographic factors, and the building of national institutions to integrate demographic concerns into the design and implementation of population and human resource planning policies (46). Technical assistance in these areas goes to governments, employers, trade unions, cooperatives, and other organizations engaged in population-related work (157). Four Labour and Population Teams working in developing countries can give additional technical support at the field level. UNFPA provides most of the funding for the population program—about $6.5 million for 1982 (46).

Requests for assistance should be sent to the ILO Regional Offices (for addresses, see p. J-649), or directly to:

Chief, Population and Labour Policies Branch
International Labour Office
CH-1211 Geneva 22, Switzerland

The **Food and Agriculture Organization (FAO)** is a United Nations agency involved in the population field through its mandate to raise rural living standards (52). FAO is not a funding agency for population projects but instead functions as an executing agency for projects financed by other bilateral and multilateral agencies. The FAO budget for population activities in 1981 was approximately $3 million, of which $2.4 million came from UNFPA (157). Requests for technical assistance should be directed to the UNDP Resident Representative or FAO Country Representative in the applicant country or to:

FAO Population Program Coordinator
Food and Agriculture Organization
Via delle Terme di Caracalla
00100 Rome, Italy

The population program of the **United Nations Educational, Scientific and Cultural Organization (UNESCO)** is intended to increase knowledge and awareness of the causes and consequences of population change, their interrelationship with other aspects of development, and their implications for human rights and the quality of life (157). UNESCO works primarily through ministries of education to include population materials in school curricula (see **Population Reports**, *Population Education in the Schools*, M-6, March-April 1982). The UNESCO Regular Programme budget for population activities is $937,900 for 1981–83, or $312,670 per year (157). Additionally, UNFPA funds UNESCO as executing agency for a number of population communication and education projects (157). In 1981 the UNFPA expenditure through UNESCO was $3.3 million (157).

UNESCO maintains offices in New York and Havana and Regional Education offices elsewhere (for addresses, see p. J-649). Requests for assistance should be sent, preferably through the National Commission for Cooperation with UNESCO, to the Director-General of UNESCO.

Director-General
United Nations Educational, Scientific and Cultural
Organization
7 Place de Fontenoy
75700 Paris, France

The **World Health Organization (WHO)** provides about $36 million annually for population-related assistance, of which about $23 million comes through UNFPA (88). WHO has supported the introduction of family planning within health care systems, particularly within maternal and child health programs, since the early 1970s. Family planning has been endorsed as an essential element of primary health care. Targets for increasing family planning coverage are part of the future work program of WHO. WHO support helps national maternal and child health and family planning programs in about 90 countries to strengthen managerial, service, educational, and training capabilities. WHO also carries out a large international program of promotion and research in managerial and technical aspects of family planning as part of primary health care (88).

The Special Programme of Research, Development and Research Training in Human Reproduction is the main instrument within WHO for promoting and coordinating international research and development related to family planning (179). It carries out research on fertility control methods, infertility, and the provision of family planning services; supports manpower training and facilities for research; and disseminates information on family planning research (179). The Programme is funded largely by voluntary contributions from national governments. The income of the Programme in 1981 was $16.3 million (88), or 45 percent of WHO spending on family planning.

Requests for assistance should be directed to the appropriate WHO regional office (for addresses, see p. J-649) or to:

Director, Division of Family Health
or
Director, Special Programme of Research, Development and
Research Training in Human Reproduction
World Health Organization
1211 Geneva 27, Switzerland

The **Pan American Health Organization (PAHO)**, a regional office of the World Health Organization, can assist Latin American and Caribbean governments or the agencies they designate to formulate and implement population and family planning policies and service programs integrated into maternal

World Bank population loans, which now total $441 million, emphasize construction of facilities and infrastructure development. The first such population loan, to Jamaica in 1970, supported construction of an extension to Victoria Jubilee Hospital, Kingston, where these women learn about family planning. (J. Pickerell/World Bank)

and child health and primary health care (157). PAHO is the executing agency for 23 UNFPA-funded national projects and also is responsible for regional, interregional, and intercountry activities. Current areas of interest include manpower development, health education, social work, and program administration and evaluation (157). The PAHO budget for population activities for the 2-year period 1980–81 was approximately $18.2 million, almost all of it within integrated maternal and child health programs (157). This funding is included in the total of $36 million provided by WHO. The population budget for the two years 1982 and 1983 is $19.4 million, or an average of $9.7 million a year (125). Requests for assistance should be sent through a country's Ministry of Health to the PAHO Country Representative. General inquiries should be sent to:
Chief, Division of Comprehensive Health Services
Pan American Health Organization
525 23rd Street, N.W.
Washington, D.C. 20037, USA

The **World Bank**—formally the International Bank for Reconstruction and Development and the International Development Association—provides loans and technical assistance to member countries for a wide range of development projects. In the population field the Bank provides funding for long-term, comprehensive population projects that are part of national programs, often arranging co-financing with other international donors (157).

The Bank's new loan commitments for population projects were $111 million in 1980, $12.5 million in 1981, and $23 million in 1982 (211–213). Since 1970 the Bank has made 23 loans totaling $441 million for population projects in 13 developing countries—Bangladesh, the Dominican Republic, Egypt, India, Indonesia, Jamaica, Kenya, Malaysia, the Philippines, South Korea, Thailand, Trinidad and Tobago, and Tunisia (201–213). Disbursements in the period 1970–82 are estimated at about $348 million. These loans include substantial sums for health infrastructure development and construction of facilities (157, 160).

During the late 1970s the Bank began to stress integrated projects linking population with health and nutrition (167). Despite moderate increases in funding for population activities during the 1970s (59), overall the Bank has committed less than one percent of its resources to population, health, and nutrition projects (102, 167). The integration of family planning with other health and education programs has made population/family planning assistance more difficult to identify.

The World Bank has 31 missions abroad. Inquiries should be sent to:
Director
Population, Health, and Nutrition Department
World Bank
1818 H Street, N.W.
Washington, D.C. 20433, USA

The **Asian Development Bank (ADB),** an international development finance institution with 29 Asian and Pacific country members and 14 members from outside the region, first supported combined health and population programs in 1978. ADB provides loans to its developing-country members, usually for civil works, equipment, supplies, fellowships, consultancies, and construction of health centers and support facilities (157). Between 1978 and 1981 ADB approved loans for multiyear health and population projects in Bangladesh, Burma, Hong Kong, Malaysia, Pakistan, and Singapore. In 1982 new loans to Papua New Guinea and Sri Lanka were approved. ADB also has given technical assistance with project preparation to Bangladesh, Burma, Indonesia, Nepal, Pakistan, and Papua New Guinea. Since 1978 ADB has approved loans for health and population projects totaling about $135 million and provided technical assistance totaling over $1.0 million (186). Inquiries should be sent to:
Mr. Mazhar A. Khan, Manager
Social Infrastructure Division
Asian Development Bank
P.O. Box 789
Manila, Philippines

The Population Programme of the **Association of South-East Asian Nations (ASEAN)** was established in 1976 to seek funding for intercountry projects and to strengthen the national population programs of the ASEAN member countries—Indonesia, Malaysia, the Philippines, Singapore, and Thailand (5).

The Population Programme, consisting of 12 projects, is being implemented in two phases. Phase I, funded by UNFPA with FAO as the executing agency, comprised five projects, two of which are still underway. Phase II, funded by the Australian government, began in 1980 and comprised seven 2- or 3-year projects (1, 12). The projects involve a broad range of population-related subjects. Most involve all member countries, although in each project one country serves as project coordinator. The budgets for Phase II projects range from about $87,000 to about $750,000. The total budget for Phase II is $3.45 million (11). Inquires should be sent to:
Mr. Benjamin D. De León, Executive Director
ASEAN Population Coordinating Unit
P.O. Box 186
Jakarta, Indonesia

NONGOVERNMENTAL FUNDING ORGANIZATIONS

The Rockefeller and Ford Foundations were the first organizations to provide assistance for population/family planning activities in developing countries. Although the Ford Foundation has reduced its commitment in recent years, a number of other private funding agencies have joined these early donors. Nongovernmental funding agencies vary in the emphasis of their support, but most provide small grants to other private agencies for specific projects or for general support of technical assistance.

The **Rockefeller Foundation** is a philanthropic organization endowed in 1913 by John D. Rockefeller "to promote the well-being of mankind throughout the world" (139). Current appropriations are made from investment income. Funding for work in the population field comes through the Population Sciences Division, a component of the Foundation's Population and Health Program. The Division appropriated $4.2 million in 1981, $4.0 million in 1982, and has a budget of $4.2 million for 1983. These appropriations constitute roughly 10 percent of all money given out by the Foundation annually (104).

The Population Sciences Division funds research and training in reproductive biology, demography, social sciences, and contraceptive technology. It also supports policy studies involving population dynamics, fertility, and methods of fertility control (139). The Foundation also assists field programs and disseminates information, but does not in general sponsor either large-scale family planning service-delivery programs or population education geared toward public advocacy.

In recent years the Foundation has funded training of Latin American scientists in reproductive biology, research centers in reproductive biology in Brazil, Chile, China, Israel, Nigeria, and Thailand, and research projects on gossypol and steroid implants (139). Grants for specific research projects, in both biomedical and policy research, are usually in the range of $15,000 to $50,000. Several dozen are awarded annually. In addition, the Foundation has continued to provide major support for the Population Council (139).

Requests for assistance, which usually come from institutions rather than from individuals, should include a short description of the project, personnel qualifications, and a comprehensive plan for funding during and, where applicable, after the proposed grant period (139). They should be addressed to:

Sheldon J. Segal, Ph.D., Director, Population Sciences
The Rockefeller Foundation
1133 Avenue of the Americas
New York, New York 10036, USA

The **Ford Foundation** first supported population activities in 1952 and subsequently became a major source of funding for biomedical research, policy research, and family planning programs in developing countries (157). Foundation funding for population peaked at $17.3 million in fiscal year 1971 (156) and was $3.7 million in fiscal year 1982 (61).

Although the separate population program is now being phased out, the Foundation will continue in 1983 to support work in reproductive science, contraceptive development, and contraceptive safety (54, 61). Also, funding is available to governments, universities, and other nonprofit institutions for work on such population-related issues as immigration and refugees, fertility-related health issues, women's programs, teenage pregnancy, and the impact of population pressure on natural resources (54).

In fiscal years 1977 through 1981 the Foundation provided $40.3 million in population assistance (157). In 1982 and 1983 it is continuing major support for the Population Council, the International Committee for Contraceptive Research, and a limited number of targeted research projects (53, 54). Other work in population may be supported under new initiatives in child health and nutrition, immigration, and assistance to refugees (61).

Before making a detailed application, prospective applicants should send the Foundation a brief letter describing project objectives, work program, personnel qualifications, budget, current means of support, and status of applications to other funding sources. Letters should be sent to the nearest of the nine area offices (for addresses, see p. J-650) or to:

Oscar Harkavy, Ph.D., Chief Program Officer
The Ford Foundation
320 East 43rd Street
New York, New York 10017, USA

The **Asia Foundation** is a nonprofit philanthropic organization founded in 1954 to assist the peaceful development of Asian societies and to promote Asian-American understanding and cooperation (15). Its largest single source of support is a general-purpose grant from the US Congress through the State Department. US AID and private donors also contribute to the Foundation (15).

In recent years the Foundation has provided grants, mostly less than $10,000, to organizations in Bangladesh, Indonesia, Pakistan, the Philippines, and Sri Lanka for multipurpose programs with family planning components (13,14,15). The recipient is required to make a matching commitment in local resources, services, and time (157). Expenditures in all fields in fiscal year 1981 were $6.7 million (15). Requests for assistance may be submitted to a Foundation resident representative (for addresses, see p. J-650) or directly to:

Dr. Haydn Williams, President
The Asia Foundation
P.O. Box 3223
San Francisco, California 94119, USA

The **Family Life and Population Program of Church World Service (FLPP/CWS)** supports family planning as an integral

Family planning service agencies often obtain support from a variety of sources. In Bangladesh the family planning program of Concerned Women, a nongovernmental organization, received help first from private donors such as PCC and from the US AID-funded intermediary organization FPIA, then from the government of Bangladesh, which in turn receives help from intergovernmental organizations and from donor governments. (Chernush/World Bank) part of community self-help development programs conducted through church-related agencies. In addition to maternal and child health and family planning services, FLPP/CWS works in family planning education, health, nutrition, literacy, skills training, and the status of women (182). FLPP/CWS is funded chiefly by member denominations of the National Council of Churches of Christ in the USA.

Since its start in 1965, FLPP/CWS has funded more than 1,400 projects in 58 countries. In 1981 FLPP/CWS supported more than 20 family planning/family life/health projects in developing countries (182). The average size of 1981 grants was about $9,000 (160). Some of the larger grants supported a training consultant in family life education in New Guinea, the Philippines, and Hong Kong; a workshop on adolescent fertility in Africa; a family life education program in the Caribbean; and a social service program in Egypt (160). The 1982 budget for overseas programs was approximately $500,000 (140). Inquiries should be sent to:

Mrs. Iluminada Rodriguez, Director
Family Life and Population Program
Church World Service
475 Riverside Drive
New York, New York 10115, USA

The **General Service Foundation** is a private organization that supports population, education, and environmental projects carried out by other private, nonprofit organizations (157). In the last several years the Foundation has shifted its program emphasis. In 1979 and 1980 about two-thirds of grants were made in the population field, while in 1981 and 1982 about two-thirds of grants were made in education (157). Grants for population work totaled $262,500 in 1981 and $35,000 in 1982 (10, 95). The estimated budget for population in 1983 is approximately $125,000 (95). In 1981–82 support for population work included grants to the Population Council for contraceptive development and international programs, to the Population Crisis Committee, to the Johns Hopkins Program for International Education in Gynecology and Obstetrics (JHPIEGO), to the Center for Population and Family Health at Columbia University, to the Program for the Introduction and Adaptation of Contraceptive Technology (PIACT), and to the Pathfinder Fund (10, 95, 160). Requests for assistance should be sent to:

David A. Lanegran, Ph.D., Program Associate
General Service Foundation
c/o Macalester College
St. Paul, Minnesota 55105, USA

The **William & Flora Hewlett Foundation** is one of the few US foundations currently increasing support for population work. Hewlett Foundation grants for population work totaled $1.72 million in 1981 and $2.95 million in 1982 (67, 111). These grants go to US-based institutions, most of which work in developing countries. The Hewlett Foundation is particularly interested in funding training of population experts, policy-related research, comprehensive family planning services, and other fertility-reducing programs. It does not support biomedical research on reproduction, contraceptive development, or population education for the general public (67). In recent years the Hewlett Foundation awarded 3-year grants to the Association for Voluntary Sterilization (AVS), the Centre for Development and Population Activities (CEDPA), the International Fertility Research Program (IFRP), the Pathfinder Fund, and the Population Council as well as grants to US universities and other organizations (67 111). Applications for assistance should briefly describe funding requirements and the content of the proposed project. They should be sent to:

Ms. Anne Firth Murray, Program Officer
The William & Flora Hewlett Foundation
525 Middlefield Road
Menlo Park, California 94025, USA

Although the **Andrew W. Mellon Foundation** does not support developing-country projects directly, it does provide major financial support to other institutions that work in the developing world. Grants for population work in 1981 totaled $5.69 million (107) and were $6.8 million in 1982 (194). These included grants to the Program for the Introduction and Adaptation of Contraceptive Technology (PIACT) for a loan fund to improve contraceptive technology and provide small grants in developing countries. Grants in 1981 also went to the Population Council for work on contraceptive development and to US medical schools and universities to support research in reproductive biology (107). Applications should be sent to:

Mr. J. Kellum Smith, Vice President and Secretary
The Andrew W. Mellon Foundation
140 East 62nd Street
New York, New York 10021, USA

Population Concern is a private organization operating under the auspices of the Family Planning Association of the United Kingdom. In recent years Population Concern has given grants, usually ranging from about $10,000 to $60,000, to family planning associations in Bangladesh, Ecuador, Hong Kong, India, Indonesia, Kenya, Pakistan, Paraguay, the Philippines, and Thailand (130, 158, 159, 160). Approved projects usually are submitted for cofunding to the European Economic Community and the Co-funding Scheme of the UK Overseas Development Administration (157). The 1981 budget, derived primarily from private contributions and matching grants, was approximately $425,000, over half of which was allocated to programs outside the UK (130). Requests for assistance, which must come from institutions, should describe the objectives, target groups, activities, budget, and evaluation plan of the proposed project. They should be sent to:

Ms. Rajamani Rowley, Information Officer
Population Concern
Margaret Pyke House
27–35 Mortimer Street
London W1N 7RJ, UK

The **Population Crisis Committee (PCC)/Draper Fund** was established in 1965 by leaders in the population movement, including General William H. Draper, Jr., for whom the Draper Fund was named. Through its Special Projects Fund, created in 1975, PCC raises private funds for family planning projects in developing countries, with emphasis on programs in large countries with potential for self-sufficiency and replicability (132). PCC generally identifies and implements such projects through recognized intermediaries in the family planning field (157).

Recent projects supported by PCC have included trial community-based contraceptive distribution in India; clinical services and training in Bangladesh, India, Indonesia, Nigeria, the Philippines, and Thailand; distribution of injectable contraceptives in Indonesia, Kenya, and the Philippines in cooperation with IPPF; and training programs through the International Women's Health Coalition (132). In 1982 about $600,000 was allocated to family planning projects outside the US (96). Applica-

Table 4. Principal Activities Supported or Undertaken by Major Sourc

	Research				Training				Supplies & Services											
						Short-Term Training														
	Biomedical	Demographic	Social Science & Policy	Operations Research	Degree Program	Reproductive Health & Family Planning	Demography	Other	Oral Contraceptives	IUDs	Barrier Methods	Injectables	Sterilization Equipment & Supplies	Periodic Abstinence	CBD Systems	MCH/ Primary Care	Information, Education, Communication	Status of Women	Population Distribution	Building Construction	Vehicles and/or Maintenance
NATIONAL GOVERNMENTS																					
United States AID	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X¹	X
Centers for Disease Control	X	X	X			X	X	X							X	X	X				
Bureau of the Census		X	X		X		X	X													
National Center for Health Statistics		X	X																		
Japan	X		X			X					X					X	X				X
Sweden	X		X			X					X		X			X	X	X		X	X
Norway	X	X	X			X			X	X	X		X			X	X	X	X	X	X
Germany, Fed. Rep. of	X	X	X						X	X				X		X	X			X	X
United Kingdom	X	X	X			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Netherlands	—Multilateral assistance only, primarily through IPPF and UNFPA—																				
Canada	X	X	X				X	X	X			X		X	X	X	X	X	X		X¹
International Development Research Centre	X	X	X			X	X	X	X	X	X	X			X		X	X	X		
Denmark	X	X	X						X							X	X	X	X		
Australia	X	X	X			X	X	X	X	X	X	X				X	X	X	X		
Switzerland	—Multilateral assistance through UNFPA only—																				
Belgium		X														X	X				
Finland	X	X	X								X					X	X	X	X	X	
New Zealand	—Multilateral assistance only, primarily through IPPF and UNFPA—																				
INTERGOVERNMENTAL AGENCIES																					
UN Fund for Population Activities	X	X	X		X	X			X	X	X	X	X	X	X	X	X	X	X	X¹	X
UN Population Division		X	X				X											X	X		
UN Population Programmes and Projects Branch		X	X		X		X												X		
UN Regional Commissions		X	X		X		X	X								X	X	X	X		
UN Children's Fund			X					X	X²	X²	X²	X²	X²			X	X	X			X²
International Labour Office		X	X					X							X		X	X	X		
Food and Agriculture Organization			X					X									X				X
UN Educational, Scientific and Cultural Organization	X	X		X	X	X	X										X	X	X		X
World Health Organization	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X
Pan American Health Organization	X	X			X	X	X	X	X	X	X	X	X		X	X	X	X		X	
World Bank		X	X		X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X
Asian Development Bank						X			X	X	X		X			X	X			X	X
Association of South-East Asian Nations		X	X													X	X	X	X		
FUNDING ORGANIZATIONS																					
Rockefeller Foundation	X	X	X				X	X													
Ford Foundation	X	X	X		X	X		X								X	X	X	X		
Asia Foundation		X	X			X	X	X	X³	X³	X³	X³	X³	X³	X³		X	X			
Church World Service						X									X	X	X	X			X
General Service Foundation		X	X			X		X					X		X		X				X
Hewlett Foundation		X	X		X	X	X	X							X	X	X				
Mellon Foundation[4]																					
Population Concern						X										X	X	X			X
Population Crisis Committee/Draper Fund						X			X	X	X	X	X		X	X	X	X			
FUNDING & TECHNICAL ASSISTANCE ORGANIZATIONS																					
International Planned Parenthood Federation	X		X	X		X		X	X	X	X	X	X	X	X	X	X	X			X
Population Council	X	X	X					X									X				
Association for Voluntary Sterilization				X		X							X				X				
Battelle Memorial Institute		X	X					X									X				
Columbia University Center for Population and Family Health		X	X	X	X	X	X	X							X	X	X				

of Population/Family Planning Funding and/or Technical Assistance

	Research				Training				Supplies & Services											
						Short-Term Training														
	Biomedical	Demographic	Social Science & Policy	Operations Research	Degree Program	Reproductive Health & Family Planning	Demography	Other	Oral Contraceptives	IUDs	Barrier Methods	Injectables	Sterilization Equipment & Supplies	Periodic Abstinence	CBD Systems	MCH/ Primary Care	Information, Education, Communication	Status of Women	Population Distribution	Building Construction	Vehicles and/or Maintenance
FUNDING & TECHNICAL ASSISTANCE ORGANIZATIONS (CONTINUED)																					
Development Associates		X	X			X	X	X									X	X	X		
East-West Center		X	X		X		X	X									X	X	X		
Family Health International	X	X				X		X								X	X				
Family Planning International Assistance						X			X	X	X		X	X	X	X	X	X			
Futures Group		X	X				X	X	X[5]	X[5]	X[5]				X		X	X			
International Federation for Family Life Promotion	X					X								X			X	X			
INTRAH						X										X					
Japanese Organization for International Cooperation in Family Planning						X						X			X	X	X	X			X
Johns Hopkins Population Center & Population Information Program	X	X	X	X	X	X	X	X							X	X	X		X		
Johns Hopkins Program for International Education in Gynecology and Obstetrics	X			X		X			X	X	X		X	X		X	X				
Partners of the Americas						X		X								X	X	X			
Pathfinder Fund						X		X	X	X	X		X		X	X	X	X			X
Program for Applied Research in [illegible]ility Regulation	X							X									X				
[illegible]ram for Intro-[illegible]tion and Adaptation of Contraceptive Technology	X		X					X	X	X	X	X					X			X	X
Regional Training Service Agency/Asia						X										X					
Research Triangle Institute		X	X				X	X									X		X		
Westinghouse Health Systems		X	X				X									X	X	X			
World Neighbors						X			X	X	X	X	X	X	X	X	X	X	X		
World Organization of the Ovulation Method (Billings)	X					X								X			X				
TECHNICAL ASSISTANCE ORGANIZATIONS[6]																					
American Public Health Association		X	X			X		X							X	X	X	X			
Centre for Development and Population Activities								X							X	X	X	X			
International Committee on Management of Population Programmes			X					X							X	X	X	X	X		
International Statistical Institute		X		X			X										X				
Management Sciences for Health		X	X	X				X								X	X	X			
Margaret Sanger Center						X									X	X					
Meals for Millions/ Freedom from Hunger Foundation						X		X									X				
Save the Children																X	X	X	X		
World Education			X			X		X									X	X			
World Federation of Health Agencies for the Advancement of Voluntary Surgical Contraception			X														X				

[illegible] limited basis or in special circumstances
[illegible] a reimbursable basis only, at request of UNFPA
[3] Bangladesh only
[4] Supports a variety of activities indirectly through support for other organizations
[5] Through social marketing projects
[6] Recipients of assistance may be required to pay for some or all services of certain organizations.

tions can be made through other population/family planning organizations or directly to:

Mr. Robert B. Wallace, Chairman
Special Projects Fund
Population Crisis Committee
1120 19th Street, N.W.
Washington, D.C. 20036, USA

NONGOVERNMENTAL FUNDING AND TECHNICAL ASSISTANCE ORGANIZATIONS

A wide variety of organizations provide both funding and technical assistance in population/family planning. Some are clearly international, with a long history of worldwide operations; others have a distinct national base but involve different nationalities as directors, advisers, and staff and carry out international operations with funding from various sources. The largest international agency, IPPF, supports a broad range of family planning services and supplies delivered by member family planning associations throughout the world. Most other organizations emphasize particular activities, such as research, training, or evaluation.

Nongovernmental funding and technical assistance organizations play an important role in encouraging innovation. They support activities, such as the development of new delivery systems, that many government programs are not yet implementing. These organizations are supported by contributions from individuals, foundation and corporate grants, and governments. While several European donor governments provide some support to private organizations such as CARE and Save the Children, US AID is the major source of support for many private voluntary agencies, especially those based in the US.

The **International Planned Parenthood Federation (IPPF)** is the largest international nongovernmental agency providing family planning services and supporting programs to heighten public and governmental awareness of population problems (173). IPPF was organized in 1952 and works almost entirely through its 117 member family planning associations throughout the world. (For names and addresses of member associations, see p. J-651.) It receives grants and commodities from a number of governments, foundations, and private citizens (157), which are distributed in turn to member associations. The governments of the United States, Japan, and Sweden have been the largest contributors over the last several years (75, 76).

Expenditures in both 1980 and 1981 were approximately $50 million, and projected expenditures for 1982 were $51.2 million (40). In 1981, 76 member family planning associations reported serving 5 million people. Of these, 1.9 million, or about two-fifths, were new clients (76).

IPPF and its member associations have pioneered support for community-based distribution (CBD) of family planning supplies and services (74). In 1981, 40 member associations carried out some form of nonclinical distribution through 80 different projects. Nearly 30 associations reported serving a total of 1.7 million people—about one-third of all clients—through CBD (76). Increasingly, IPPF also is supporting income-generating activities for women and integrated family planning–community development and/or health services (173).

IPPF is a major supplier of contraceptives. In 1981 IPPF purchased contraceptives for $3.3 million and received an additional quantity worth $1.1 million from USAID. Contraceptives acquired by IPPF included more than 13 million cycles of oral contraceptives, 33 million condoms, more than 700,000 IUDs, 355,000 doses of the injectable Depo-Provera, 8.5 million foaming tablets, and various quantities of other spermicides (76).

Organizations seeking assistance should consult initially with the local family planning association within each country. General inquiries should be sent to:

International Planned Parenthood Federation
18–20 Lower Regent Street
London SW1Y 4PW, UK

The **Population Council**, a scientific and professional organization established in 1952, works in the areas of biomedical research; social science and policy; and health, family planning, and other population-related programs (131). The Council awards grants and contracts to nonprofit, private, and government organizations, provides technical assistance in developing countries, supports training and fellowships for qualified professionals in the population field, and publishes two major population journals, *Studies in Family Planning* and *Population and Development Review* (157). The Population Council receives a large portion of its funds from US AID and the Ford and Rockefeller Foundations. It also receives support from other governments, private foundations, and multilateral organizations (131).

The Population Council budget for 1982 was $17.7 million, of which $5.6 million was budgeted for awards, contracts, and fellowships. The estimated 1983 budget is $18.0 million. Recent projects supported by the Population Council include research on subdermal implants, contraceptive rings, and progestin-releasing IUDs; analysis of population policies in Pakistan, Indonesia, Cuba, and Jamaica; analysis of women's roles in Latin America and the Caribbean; and large-scale family planning projects in Tunisia and South and East Asia (131).

Inquiries about biomedical research or particular countries or regions should be sent to the appropriate branch office (for addresses, see p. J-650). General inquiries should be sent to:

Mr. George Zeidenstein, President
The Population Council
One Dag Hammarskjold Plaza
New York, New York 10017, USA

The **Association for Voluntary Sterilization (AVS)**, established in 1943, started a program of international assistance in 1972 to support voluntary female and male sterilization in developing countries. The program emphasizes training, service support, operations research, and technical assistance in order to increase the availability of voluntary sterilization services (157).

The AVS international program, which is funded largely by US AID, spent $9.2 million in 1981 for projects in more than 30 countries (19). The largest grants supported projects in Bangladesh, Guatemala, and Tunisia (160). The 1982 budget for international activities was $9.7 million (30).

AVS has regional offices in Bangladesh, Tunisia, and, for the Latin American region, New York (for addresses, see p. J-650). Applications for assistance should be obtained from and returned to:

Mr. Terrence W. Jezowski, Director of International Programs
Association for Voluntary Sterilization
122 East 42nd Street
New York, New York 10168, USA

As part of the Population and Development Policy Program, the Battelle Human Affairs Research Centers support conferences and workshops on population policy issues. Here a Nigerian government official addresses a Battelle-supported conference on "Major Population and Development Issues in Nigeria" at the University of Ibadan in 1982. (Battelle Human Affairs Research Centers)

The Population and Development Policy (PDP) Program of the **Battelle Human Affairs Research Centers**, with funding from US AID, assists research institutes in developing countries (1) to review and analyze social science and demographic research findings relevant to population policy formulation and implementation and (2) to present those findings to government officials and other leaders through workshops, conferences, publications, and the media (92).

PDP has a $4 million budget for the period July 1980–April 1983. Currently PDP has projects in Brazil, the Dominican Republic, Haiti, Jordan, Nepal, Nigeria, Peru, Senegal, Sudan, Togo, and Turkey. Research topics have included Islam and family planning, family planning and health care delivery systems, population and the role of women, and problems of rapid population growth and education, health, food production, income distribution, urbanization, and the environment (92). Requests for assistance should be sent to:

James Kocher, Ph.D., and
Michael Micklin, Ph.D., Co-Directors
Population and Development Policy Program
Battelle Human Affairs Research Centers
Battelle Memorial Institute
2030 M Street, N.W.
Washington, D.C. 20036, USA

The **Columbia University Center for Population and Family Health (CPFH)**, established in 1975, focuses on improving the design, management, and evaluation of low-cost family planning and health programs in developing countries, particularly community-level programs (97).

The Center has recently given technical assistance to community-based family planning and health programs in Guatemala, Mexico, Nigeria, and Sudan. It participated in household distribution of contraceptives in Haiti, commercial distribution of contraceptives in Sri Lanka, and other family planning activities in Bangladesh, Brazil, Indonesia, South Korea, and Thailand. CPFH is currently conducting a study of infant feeding in four countries (33). A one-month training course in community-based program design and management is held in New York every June, and in-country workshops on related issues will be conducted in five African countries over the next two years.

The Center's international activities are funded primarily by US AID, with additional support from UNFPA and private foundations. The 1982 budget for international activities was $3.2 million (97).

The Center has resident technical advisors stationed in seven countries. Requests for assistance should be sent to:

Allan G. Rosenfield, M.D., Director
Center for Population and Family Health
Columbia University
60 Haven Avenue
New York, New York 10032, USA

Development Associates, a private consulting firm, trains paramedical, auxiliary, and community personnel in Latin America and the Caribbean for family planning work. The project, funded by US AID, provides technical assistance and short-term training to governmental and private agencies with viable family planning programs. The current 5-year project, which began in 1979, had an annual budget in 1981 and 1982 of $2.5 million. In the first 30 months of the project, Development Associates trained over 28,000 health personnel from 23 countries in management of community-based distribution programs, patient education and motivation, clinical skills (including IUD insertion), training of trainers, program management, and supervision (42, 43, 85). Most training is conducted in-country under the auspices of local public and/or nongovernmental family planning agencies. Requests for assistance should be sent to:

Division of Population Programs
Development Associates, Inc.
2924 Columbia Pike
Arlington, Virginia 22204, USA

The Population Institute of the **East-West Center** works chiefly in four areas: demographic trends and estimation; fertility and family in transition; economic development and human resources; and urbanization, migration, and development. The geographic focus is Asia, the Pacific, and the United States.

Founded in 1969, the Institute conducts and supports research, promotes graduate study in the population field, organizes short-term training programs, and engages in technical cooperation with other institutes. The Institute receives funding from Asian and Pacific governments and the US, regional agencies, foundations, and private corporations (157). Recent

Together, MCH personnel from the state of Chihuahua, Mexico, and personnel from CPFH at Columbia University train community health workers in family planning and other primary health care activities as part of the New Strategies Project, funded by the Mexican Ministry of Health and US AID through CPFH. (M. Shedlin) research has examined techniques for evaluating family planning program effectiveness, evaluation of household distribution of contraceptives, and analysis of World Fertility Survey data (47). Information on the total expenditures of the Institute is not available. Applications for assistance should be sent to:

Dr. Lee-Jay Cho, Director
Population Institute
East-West Center
1777 East-West Road
Honolulu, Hawaii 96848, USA

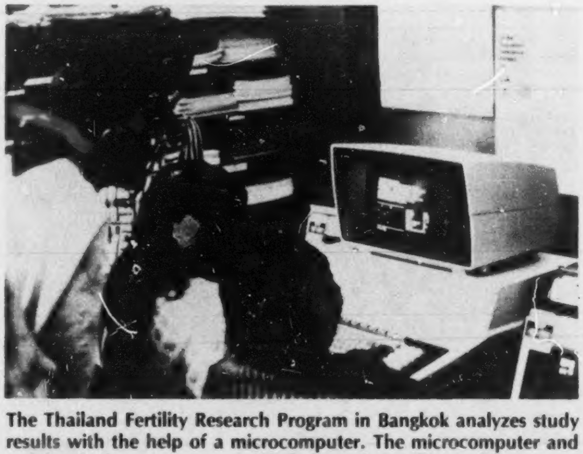
Family Health International (FHI), formerly the International Fertility Research Program (IFRP), was established in 1971 to support contraceptive, epidemiologic, and program-oriented research on fertility-related issues (73). Through a network of 251 cooperating investigators in 47 countries (4), FHI conducts research, trains researchers, and disseminates information on population and health matters (73). FHI receives most of its funds from US AID but also is supported by private and other government research contracts and by foundation grants (4). FHI expenditures for fiscal year 1981 were $6.3 million (73). The 1982 budget was $6.4 million (4).

FHI currently assists national biomedical research centers in Bangladesh, Colombia, Egypt, Indonesia, Malaysia, Sudan, Thailand, and Tunisia with work on such subjects as nonsurgical female sterilization, oral contraceptives, postpartum IUDs, barrier methods, and Natural Family Planning. FHI also has supported studies of female circumcision in Sudan, breastfeeding in Mexico, reproductive-age mortality in Egypt and Indonesia, contraceptive needs and services in Brazil and Nigeria, and maternity care throughout the developing world (73).

Applications for assistance should describe project objectives, qualifications of personnel, facilities required, patient load involved, and the like. They should be sent to the appropriate FHI regional offices in Africa or Latin America (for addresses, see p. J-650) or to:

Dr. Malcolm Potts, President
Family Health International
Research Triangle Park, North Carolina 27709, USA

Family Planning International Assistance (FPIA), the international division of the Planned Parenthood Federation of America, was started in 1971 with funds from US AID to build and support family planning services in developing countries (157). FPIA does not operate programs but instead provides contraceptive supplies and a wide range of technical, material, and financial assistance to a variety of organizations—family planning associations, church groups, hospitals, agricultural organizations, women's groups, development agencies, youth associations, and labor unions, as well as government institutions responsible for family planning programs (48).



The Thailand Fertility Research Program in Bangkok analyzes study results with the help of a microcomputer. The microcomputer and training in its use were provided through Family Health International, formerly IFRP. (Whitehorne/Family Health International)

In fiscal year 1981 FPIA provided $13.4 million in direct international assistance, of which $8.1 million was for projects and $5.3 million for commodities. It funded 103 family planning projects in 32 countries and provided commodities to 18 additional countries (170). In 1981 Mexico, Brazil, Bangladesh, and Thailand received the largest amounts. Between 1971 and 1982 the countries that have received the most FPIA assistance are Mexico, the Philippines, Bangladesh, Thailand, and Indonesia. Assistance provided in 1982 was expected to exceed $15 million (170).

Applications for assistance should be sent to the appropriate regional representative (for addresses, see p. J-650). General inquiries should be sent to:

Dr. Daniel Weintraub, Chief Operating Officer
Family Planning International Assistance
810 Seventh Avenue
New York, New York 10019, USA

The **Futures Group** is a private research and consulting firm currently involved in two major population projects, both funded by US AID. During 1982 the Futures Group spent about $1.8 million on population-related projects (4).

The Resources for the Awareness of Population Impacts on Development (RAPID) project analyzes the population status and trends in a country and their effects on the achievement of national economic and social goals (55). It is a 5-year, $4 million project which began in 1977. RAPID computer analyses have been conducted in approximately 30 countries (160).

The Worldwide Contraceptive Retail Sales (CRS) Project provides technical and financial assistance to new and ongoing social marketing programs for the subsidized sale of contraceptives (157). The CRS Project is a 3-year project continuing through July 1983 and has $1.3 million available for grants (160). It has provided technical or financial assistance in over 20 countries (2).

The Futures Group has headquarters in Glastonbury, Connecticut, USA. Both population projects are conducted largely through the Washington, D.C., office, however. Inquiries should be sent to:

Dr. Robert Smith, Vice President, Washington Operations
The Futures Group
1029 Vermont Avenue, N.W.
Washington, D.C. 20005, USA

The **International Federation for Family Life Promotion (IFFLP)**, founded in 1974, is an association of organizations involved in research, education, and services in fertility awareness and Natural Family Planning (NFP) methods. IFFLP does not support activities involving other family planning methods. IFFLP receives funds from the Canadian and British governments, religious organizations, and private agencies (72).

In 1981 total expenses were about $300,000, of which $250,000 was spent on program services (93). The estimated 1982 budget is $125,000, of which approximately $25,000 is for program services (93). Major activities include a 3½-year NFP instructor training project in over 20 African countries, a service evaluation project, and a Third International Congress, to be held in Hong Kong in 1983 (72). Applications for assistance should be submitted to:

Claude A. Lanctot, M.D., Executive Director
International Federation for Family Life Promotion
1511 K Street, N.W., Suite 333
Washington, D.C. 20005, USA

INTRAH—The Program for International Training in Health—assists governments, universities, and other organizations in Africa and the Middle East to develop and improve training programs for paramedical, auxiliary, and community health personnel who provide services in family planning, maternal and child health, and primary health care (79, 80).

INTRAH started in 1979 and will continue at least through 1984. Short-term courses lasting from two to five weeks have covered subjects such as management and supervision of maternal and child health/family planning services, contraception, family life education, adolescent fertility, counseling, curriculum development, and program planning and evaluation. Most courses are held in the country or region of the trainees, and national co-trainers assist in the training. As of November 1982, 8,500 health personnel in 26 countries had been trained. The budget for fiscal year 1983 is $4.0 million, provided by US AID (90).

INTRAH maintains a regional office in Kenya (for address, see p. J-650). Requests for assistance, which usually come from governmental organizations and family planning associations, should be sent to:

James W. Lea, Ph.D., Director
INTRAH
University of North Carolina at Chapel Hill
208 North Columbia Street
Chapel Hill, North Carolina 27514, USA

The **Japanese Organization for International Cooperation in Family Planning (JOICFP)** is a private organization formed in 1968. Working closely with the Japanese government, JOICFP publicizes population issues in Japan and assists family planning programs in developing countries.

The 1982 budget for JOICFP was $4.5 million, an increase of about $800,000 over the previous year (84, 157). A major interest since 1976 has been integrated family planning, nutrition, and parasite control projects carried out in 12 Asian and Latin American countries, often in collaboration with IPPF and assisted by UNFPA (4). As well as providing grants and commodities to these projects, JOICFP has conducted workshops in a number of participating countries to promote this integrated approach (157). JOICFP allocated more than $1.5 million to these activities in fiscal year 1981 (160). In addition, commodities and technical assistance have been provided to other family planning activities, primarily in Asian countries (157). Applicants for assistance should send a formal letter describing the purpose of the proposed project to:

Mr. Nobusuke Kishi, President
Japanese Organization for International Cooperation in Family Planning
Hoken Kaikan Bekkan 1-1
Sadohara-cho, Ichigaya, Shinjuku-ku
Tokyo 162, Japan

The **Johns Hopkins Population Center** can provide short-term technical training in such subjects as data analysis, evaluation methodology, design and implementation of family planning programs, cost-effectiveness studies, and population policy analysis. The Center also can provide a broad range of advanced degree training through the Departments of Population Dynamics and International Health, including training in such specialties as demography; reproductive health; health planning, management, and administration; reproductive biology; and relevant social science fields.

Technical assistance by Hopkins faculty has been organized by the Center to meet the needs of projects and programs in various developing countries. Recent technical assistance assignments in Latin America, Africa, Southeast Asia, China, and the Middle East have dealt with project design, program evaluation, training of project personnel, planning of research on the determinants of fertility and mortality, migration studies, and data processing and analysis.

Center activities in training, developing-country research, and technical assistance are made possible by support from US AID and grants from private foundations. The William & Flora Hewlett Foundation provides funds both for the training of foreign students at Hopkins and for collaborative research activities with colleagues from other countries.

The Population Information Program (PIP), funded by US AID, provides assistance in information, education, and communication related to family planning and population. Through **Population Reports**, a bimonthly journal; through POPLINE, a computerized online bibliographic data base of over 100,000 items; and through an extensive international mailing list, information and educational materials are widely available for a variety of uses. The annual budget for these activities is approximately $1.9 million. PIP is a part of the Hopkins Population Center.

Detailed Guides to Population Assistance

An important and comprehensive guide to sources of population/family planning assistance is *Population Programmes and Projects*, published by the United Nations Fund for Population Activities (UNFPA). The guide consists of two volumes—Volume 1, *Guide to Sources of International Population Assistance 1982*, and Volume 2, *Inventory of Population Projects in Developing Countries Around the World 1980/81*. The *Guide*, published every three years since 1976, describes the major multilateral, regional, bilateral, and nongovernmental assistance organizations, universities, and research and training institutions, and the kinds of activities they support. The *Inventory*, published every year since 1975, describes by country the type and level of support that each organization is providing.

These volumes were important references in the preparation of this issue of **Population Reports**. Copies can be obtained from UNFPA, 220 East 42nd Street, New York, New York 10017, USA. Each volume costs $12 (US).

Detailed information about population assistance through 1975 can be found in *World Population Growth and Response 1965–1975: A Decade of Global Action*, published in 1976. Copies can be obtained from the Population Reference Bureau, 1337 Connecticut Avenue, N.W., Washington, D.C. 20036, USA. The price is $4 (US).

A new project of PIP is Population Communication Services (PCS), established in 1982. An estimated budget of about $10 million over a 5-year period includes support for technical assistance and projects designed primarily to reach current and potential family planning users with mass media, print material, and person-to-person communication in traditional as well as innovative approaches. The geographic emphasis is on Africa.

Queries about Center activities and requests for assistance or information on training programs should be directed to:
John F. Kantner, Ph.D.
Department of Population Dynamics
Johns Hopkins University
School of Hygiene and Public Health
615 North Wolfe Street
Baltimore, Maryland 21205, USA

Requests for assistance from the Population Information Program should be directed to:
Phyllis T. Piotrow, Ph.D., Director
Population Information Program
Johns Hopkins University
624 North Broadway
Baltimore, Maryland 21205, USA

The **Johns Hopkins Program for International Education in Gynecology and Obstetrics (JHPIEGO)** provides instruction in obstetrical and gynecological care, management of infertility, and effective use of contraception at its Educational Center in the US and at 62 didactic and clinical training centers in developing countries. Physicians also receive training and clinical experience in endoscopy, minilaparotomy, microsurgery, and anesthesiology. Nurses, paramedical personnel, and administrators receive training in appropriate support activities (86). Additionally, JHPIEGO provides medical equipment, educational materials, consultant services, and funding to health ministries, medical schools, teaching hospitals, universities, and other educational centers. JHPIEGO is funded primarily by US AID, with some support from private foundations, UNFPA, and other donors (86).

A counselor explains contraceptive foam and other family planning methods to a young woman in Brazil's first family planning clinic especially for adolescents. The clinic, supported by the Pathfinder Fund, is located at Tsylla Balbino Maternity Hospital in the city of Salvador in Bahía state. (Courtesy of the Pathfinder Fund)

In both fiscal years 1981 and 1982, JHPIEGO had annual budgets of approximately $7 million for training and program support of qualified professionals from developing countries (25). In the first seven years of operation—1974 through 1981—4,801 leading health professionals from 1,767 institutions in 108 countries participated in the training program (86). Information and application forms may be obtained from:
JHPIEGO Registrar
550 North Broadway
Baltimore, Maryland 21205, USA

Partners of the Americas, established in 1964, is a private organization linking volunteers in 44 US states and 26 Latin American and Caribbean countries in 56 autonomous partnerships that design and implement their own community development projects (7). The volunteers represent a wide variety of service organizations and educational institutions.

In 1982 Partners received $214,000 from US AID for the first year of a 3-year grant to initiate a Women in Development program and a 3-year, $150,000 grant from the Hewlett Foundation to incorporate a family life education component into this program. These grants will be supplemented by funds from other private sources (137). In addition to providing training and consultation to the partnerships and the organizations they represent, Partners also awards small seed grants of $3,000 to $5,000 for project implementation (126). In 1982 about 10 countries received assistance in family life education, and the number is expected to increase in 1983 (137). Requests for assistance should be sent to:
Ms. Martha Lewis, Director
Women in Development Program
Partners of the Americas
2001 S Street, N.W.
Washington, D.C. 20009, USA

The **Pathfinder Fund** is a nonprofit foundation established in 1957 to foster innovative solutions to population problems in developing countries (128, 129). Through its divisions of Fertility Services, Women's Programs, and Population Policy, Pathfinder assists individuals, governments, and private organizations. It is supported by US AID, foundations, corporations, and individuals (129).

The budget for fiscal year 1981 was $8.2 million, which supported 214 projects in more than 50 developing countries (4). The budget for fiscal 1982 was approximately $9 million, of which $7.6 million was for program services (134). Recent grants have supported community-based contraceptive delivery, training of paramedical personnel, reproductive health care services for adolescents, voluntary sterilization using simple methods, policy projects, integration of family planning services with maternal and child health services and income-generation projects, and management training. Countries receiving concentrated attention have included Bangladesh, Brazil, Colombia, Ecuador, Egypt, Honduras, Indonesia, Kenya, Nigeria, Peru, and Rwanda (128).

The Pathfinder Fund has offices in Bangladesh, Brazil, Chile, Colombia, Egypt, Indonesia, Kenya, Nigeria, Peru, Switzerland, and Turkey (for addresses, see p. J-650). Requests for proposal guidelines should be sent to the appropriate Regional Director for Latin America, Africa and the Middle East, or South Asia and the Far East at:

The Pathfinder Fund
1330 Boylston Street
Chestnut Hill, Massachusetts 02167, USA

The **Program for Applied Research on Fertility Regulation (PARFR)** was established in 1972 to support research and the exchange of information on new techniques of fertility control. Basic research having clear potential also can be funded. PARFR encourages research that is conducted either entirely in developing countries or through collaboration between US institutions and research centers in developing countries (157). Emphasis is on fertility control methods that can be self-administered, that minimize supply problems, and that avoid clinical delivery systems, frequent administration, high motivation, or use at the time of sexual activity (157). Short-term, pilot projects can receive up to $10,000 for a maximum of one year, while full-scale research projects can receive up to $66,000 annually (157).

Funded by US AID, PARFR had a budget of approximately $1.5 million in fiscal year 1982. The budget for fiscal year 1983 is estimated at $1.6 million. Currently PARFR is supporting projects in Brazil, Chile, Egypt, El Salvador, India, South Korea, Mexico, the Philippines, Venezuela, West Germany, and the US (93). In fiscal year 1982 PARFR signed more than 40 research subagreements (93).

PARFR is located at Northwestern University in Chicago, Illinois. Requests for assistance should be sent to:

Mrs. Diane Krier-Morrow, Director of Administration
Program for Applied Research on Fertility Regulation
875 N. Michigan Avenue, Suite 1525
Chicago, Illinois 60611, USA

The **Program for the Introduction and Adaptation of Contraceptive Technology (PIACT)** was established in 1976 to provide technical and financial assistance for field studies of contraceptive and health products; introduction of new contraceptives in national family planning programs; development of in-country facilities to monitor contraceptive quality; feasibility studies directed toward local contraceptive production where appropriate; procurement and supply management; contraceptive distribution; and development of instructional materials for family planning users and providers (135). The PIACT International Loan Fund (ILF) provides loans for the purchase of capital equipment to manufacture or package health and contraceptive products in developing countries. PIACT is funded by international agencies, governments, and private foundations. The estimated operating budget for 1982 was $2.0 million (169).

PIACT has administrative headquarters in Seattle, Washington, and additional offices in Indonesia, the Philippines, Mexico, Switzerland, and Washington, D.C. (for addresses, see p. J-650). Requests for assistance should be addressed to:

Gordon W. Perkin, M.D., Executive Director
Program for the Introduction and Adaptation of Contraceptive Technology
130 Nickerson Street
Seattle, Washington 98109, USA

In Bangladesh a PIACT field worker seeks women's reactions to the draft version of a new pamphlet. PIACT produces pamphlets for nonliterates about many family planning methods. (M. Zimmerman)

The **Regional Training Service Agency/Asia (RTSA/Asia)** at the University of Hawaii School of Public Health aims to improve family planning service delivery systems in Asia by training paramedical, auxiliary, and community health personnel. RTSA/Asia, funded by US AID, helps governments and private organizations to establish and conduct training programs in clinic-based and CBD service delivery, to develop curricula and instructional materials, and to manage, supervise, and evaluate programs (157). In its first three years, September 1979 through September 1982, RTSA/Asia had a budget of about $4.0 million and trained 8,233 health personnel, primarily from Bangladesh, India, Indonesia, Nepal, the Philippines, Sri Lanka, and Thailand. The current focus is on India, Nepal, and Sri Lanka, although RTSA/Asia also is working in other Asian countries and at the regional level. The budget for December 1982 through September 1984 is $1.4 million (121). Requests for assistance should be sent to:

Project Director
Regional Training Service Agency/Asia
University of Hawaii School of Public Health
1890 East-West Road
Honolulu, Hawaii 96822, USA

The **Research Triangle Institute (RTI)** currently is conducting the Integrated Population and Development Planning Program (IPDP). IPDP is designed to assist planners in developing countries to make more effective use of demographic data in development planning and to increase their awareness of the development problems associated with rapid population growth and of the potential role of family planning programs in alleviating those problems (91).

The 5-year program, begun in 1979, is a collaborative effort of RTI (the prime contractor), Johns Hopkins University, University of North Carolina at Chapel Hill, and the Futures Group. By September 1982 IPDP had been involved in technical assistance, research, or training activities in 12 African, 4 Asian, and 4 Middle East/North African countries. The total budget for the 5-year period is approximately $4.6 million, funded by US AID (145). Requests for assistance should be addressed to:

Dr. James C. Knowles, Director
Integrated Population and Development Planning Program
Research Triangle Institute
P.O. Box 12194
Research Triangle Park, North Carolina 27709, USA

Westinghouse Health Systems, a division of Westinghouse Electric Corporation, was established in 1969 and currently implements three major population projects funded by US AID:

The Contraceptive Retail Sales (CRS) project introduces nonclinical contraceptive supplies and IUDs into developing countries, using commercial or nongovernmental distribution and marketing networks. The CRS project has been completed in Ghana and Jamaica and is continuing in Nepal (100).

Contraceptive Prevalence Surveys (CPS) are management-oriented survey research projects that measure knowledge, use, and availability of contraceptives in developing countries (160). Between 1977 and 1980 Westinghouse collaborated with local organizations on the first cycle of surveys in seven developing countries. Between 1979 and 1984 the second cycle of surveys is being conducted in 23 countries. Total allocations from US AID for Contraceptive Prevalence Surveys are about $15 million for 1977 through 1984 (160).

Demographic Data for Development, a 5-year project that began in 1982, provides technical assistance in demographic analysis and data processing, makes data archives available to researchers, and develops microcomputer software for demographic applications in developing countries. The project also can provide limited financial assistance for purchase of computer hardware. The US Bureau of the Census and the Population Institute at the East-West Center are cooperating in the project. Westinghouse has a total budget of about $2.9 million for the project (100).

Other Nongovernmental Sources of Funding and Technical Assistance

Many private organizations throughout the world provide some funding or technical assistance for population/family planning work. These include large charitable agencies, such as Oxfam, which supports a small amount of family planning; small professional associations, such as APLIC-International, which provide highly specialized services; and various university or other training centers, which may require individuals to pay part or all of tuition costs. Some examples of these organizations, most of which usually provide less than $100,000 of assistance in this field annually, include:

The **Asian Centre for Population and Community Development (ACPD)** (8 Sukhumvit 12, Bangkok 11, Thailand) founded by Mechai Viravaidya, offers training and technical assistance in the development, implementation, and management of community-based family planning, health, and development activities (16, 81).

The **Association for Population/Family Planning Libraries and Information Centers-International (APLIC-International)** (Carolina Population Center Library, University Square East, 300 A, Chapel Hill, North Carolina 27514, USA) provides training and technical assistance in documentation and information services related to population and family planning (17).

CARE (660 First Avenue, New York, New York 10016, USA) assists communities with family planning education and training of family welfare workers in community health and family planning, as part of integrated health and nutrition projects (101).

The **Carolina Population Center** (University of North Carolina, University Square East, Chapel Hill, North Carolina 27514, USA) gives advice on demographic and social science research, family planning, maternal and child health care, information and education, and training (157).

The **Center for Population Options** (2031 Florida Avenue, N.W., Washington, D.C. 20009, USA) operates the International Clearinghouse on Adolescent Fertility, which distributes information on adolescent pregnancy programs throughout the world.

The **Overseas Education Fund (OEF)** (2101 L Street, N.W., Suite 916, Washington, D.C. 20037, USA) conducts the Women in Development Technical Advisory Services (WIDTech) project, which gives technical assistance in organization and program management, income generation, and training and which includes a family planning component (124).

Oxfam (274 Banbury Road, Oxford OXZ 7DZ, UK), as part of its broad development assistance activities, funds maternal and child health programs, including some support to family planning associations (157).

The **Population Reference Bureau (PRB)** (1337 Connecticut Avenue, N.W., Washington, D.C. 20036, USA), founded in 1929, provides information on demography, population education, and related fields, primarily through publications, including *Population Bulletin, World Population Data Sheet,* and *Intercom* (157).

PRICOR—the Primary Health Care Operations Research project of the Center for Human Services (5530 Wisconsin Avenue, Chevy Chase, Maryland 20815, USA) assists developing countries to improve primary health care delivery. Major activities include funding and monitoring country studies, sponsoring conferences, and commissioning methodological studies in primary health care, which may include family planning components (28).

The **Transnational Family Research Institute (TFRI)** (8307 Whitman Drive, Bethesda, Maryland 20817, USA) is a multidisciplinary nonprofit research organization in the behavioral sciences. In the population area, TFRI facilitates cooperative studies on psychosocial aspects of reproductive behavior (157). Henry P. David, Ph.D., is Director.

The **Unitarian Universalist Service Committee (UUSC)** (78 Beacon Street, Boston, Massachusetts 02108, USA) provides funding and technical assistance in the design and implementation of comprehensive health and education projects, often including family life education/family planning components (32).

The **World Young Women's Christian Association (WYWCA)** (37 Quai Wilson, 1201 Geneva, Switzerland) raises special funds for member associations to support a variety of activities, including health, family planning, and family life education projects (157, 160).

Requests for assistance should be sent to:
Dr. Lawrence Smith, Jr.
Westinghouse Health Systems
Box 866
American City Building
Columbia, Maryland 21044, USA

Founded in 1951, **World Neighbors** is a private, nonsectarian international organization whose purpose is to establish and encourage self-help programs in developing countries. World Neighbors is assisting with 70 programs in 20 countries in Africa, Latin America, and Asia. The programs are concerned with food production, health, family planning, and the development of small industries. World Neighbors is supported entirely by private donations and neither solicits nor accepts government funds (180).

Twenty percent of World Neighbors assistance goes to family planning and population. This amounted to about $300,000 in fiscal year 1982 (36, 180). Although most grants range from about $3,000 to $25,000, World Neighbors has given long-term grants totaling $100,000 or more to family planning projects in Brazil, India, Nepal, the Philippines, and Togo (160). Recent projects include community-based distribution of contraceptives in Guatemala, male and female voluntary sterilization in Indonesia, and a regional workshop on injectables in Thailand (160, 180).

World Neighbors has seven area representatives (for addresses, see p. J-650). Inquiries should be addressed to the appropriate area representative or to:
Mr. Bob Curtis, Responsible Parenthood Coordinator
World Neighbors
5116 North Portland Avenue
Oklahoma City, Oklahoma 73112, USA

The **World Organization of the Ovulation Method (Billings) (WOOMB)** was formally established in 1977 to disseminate information about the ovulation method of Natural Family Planning (NFP), also known as the cervical mucus method or the Billings method (181). Currently WOOMB is active in over 100 countries. Major activities include providing assistance to ovulation method centers; preparing and disseminating educational and training materials; organizing and participating in national and international conferences; educating government officials and others about NFP; developing fertility-awareness programs for adolescents emphasizing chastity; and conducting national and international studies of the effectiveness of the ovulation method (172).

Participants in a Women in Management workshop conducted by CEDPA exchange ideas during a small-group session. These workshops help sharpen the skills of women from developing countries who are mid-level, mid-career managers of governmental or nongovernmental service delivery programs in health, family planning, nutrition, and other aspects of social development. (CEDPA)

WOOMB is supported entirely by contributions from private foundations and individuals. Requests for assistance should be sent to:
Dr. John J. Billings, President
WOOMB-International
141 Grey Street
East Melbourne 3002, Australia
or
Mrs. Mercedes A. Wilson, Executive Director
WOOMB-USA
308 South Tyler Street
Covington, Louisiana 70433, USA

NONGOVERNMENTAL TECHNICAL ASSISTANCE ORGANIZATIONS

Technical assistance and publications, but little or no funding, are available from a number of private organizations. Some of these organizations are supported by national governments and/or intergovernmental organizations. Some are tuition-supported training programs. Technical assistance available includes short-term training and advice on research and on program planning and implementation. In some cases, those requesting assistance and/or training may be expected to pay some or all of the costs themselves.

The **American Public Health Association (APHA)** International Health Programs division provides consultation, study teams, and personnel training to developing countries in health, nutrition, and family planning (4). Between 1979 and 1982 APHA gave technical assistance to 180 population projects in 42 countries. The cost of these services, funded by US AID, was $2 million, or an average of $0.5 million per year (89). Requests for assistance should be sent to:
Susi Kessler, M.D., Director
International Health Programs
American Public Health Association
1015 Fifteenth Street, N.W.
Washington, D.C. 20005, USA

The **Centre for Development and Population Activities (CEDPA)** is a nonprofit educational organization established in 1975 to provide short-term managerial and technical training for developing-country professionals in family planning, economic development, and health (29). CEDPA conducts training workshops both in the US and in developing countries. Through a special program to promote the role of women in management, CEDPA also provides technical assistance in the development of community-based projects. Between 1975 and 1982 over 1,200 individuals from 66 countries attended CEDPA training programs (29). In 1982 CEDPA provided seed money to 11 integrated projects managed by women alumnae. Follow-up management units have been established in six countries. CEDPA receives financial support from US AID, UNFPA, the Hewlett Foundation, and other private agencies and individuals. The estimated 1982 budget was approximately $900,000 (109). Applications for training should be sent to:

Mrs. Kaval Gulhati, President
Centre for Development and Population Activities
1717 Massachusetts Avenue, N.W., Suite 202
Washington, D.C. 20036, USA

The **International Committee on the Management of Population Programmes (ICOMP)** was organized in 1973 by leaders of population and family planning programs in the developing world. Membership is limited to directors of major management institutes and governmental and nongovernmental population programs. Through training workshops, annual conferences, and consultation, ICOMP assists these program managers with policy and project formulation and implementation and with program evaluation. ICOMP is supported by UNFPA, SIDA, NORAD, IDRC, the Ford Foundation, and the Hewlett Foundation (157).

A major activity of ICOMP is the International Development Assistance Project, which assists family planning management projects at management and public administration institutes in developing countries. Institutes in Bangladesh, India, the Philippines, and Venezuela have recently received ICOMP support. In 1980 and 1981 the annual budgets of ICOMP were approximately $300,000 (160). The 1982 budget was $350,000 (62). Requests for assistance should be sent to:

Dr. Mohammad A. Sattar, Executive Director
International Committee on the Management of Population Programmes
RS. 141, Taman Uda Jaya
P.O. Amtang
Selangor, Malaysia

The **International Statistical Institute (ISI)** is concerned with improving the collection, analysis, and application of statistics throughout the world. The major project of ISI is the World Fertility Survey (WFS) (see **Population Reports,** *The World Fertility Survey: Current Status and Findings*, M-3, July 1979). WFS, which started in 1972 and will end in 1984, assists countries, primarily in the developing world, to carry out representative, internationally comparable, scientifically designed and conducted sample surveys on fertility behavior (78). By June 1981, 42 developing countries and 20 developed countries were participating in WFS (157). WFS is undertaken by ISI with the collaboration of the United Nations and in cooperation with the International Union for the Scientific Study of Population (IUSSP). It is funded mainly by UNFPA, US AID, and UK ODA, with contributions from other governments. Actual expenditures by the program from funded sources, excluding countries' own contributions, were $40.2 million through 1981 (171).

In 1982 ISI established an International Statistical Research Center (ISRC), which will operate within the structure of the ISI permanent office. Its objective is to execute or to participate in statistical projects, which may include advice and technical assistance on statistical issues, project-oriented methodological research, and survey activities. Population-related activities will be included in this work (171).

General inquiries should be sent to ISI in the Netherlands. Inquiries specifically about WFS should be sent to the WFS Project Director in London.

International Statistical Institute
428 Prinses Beatrixlaan
2270 AZ Voorburg, Netherlands

Project Director
World Fertility Survey
International Statistical Institute
35–37 Grosvenor Gardens
London SW1W OBS, UK

Management Sciences for Health (MSH), established in 1969, is an educational and scientific foundation working for the practical application of management skills in health care delivery, including family planning services. MSH provides technical assistance in management to health departments, family planning programs, community organizations, and international agencies, and it offers in-country and US-based management training programs to health and family planning services personnel. Currently MSH is collaborating on long-term management projects in Haiti, Honduras, Indonesia, Morocco, and Portugal. The MSH budget for fiscal year 1982 was approximately $2.5 million (118). Inquiries should be sent to:

Dr. Jack Lesar, Director of Technical Program Development
or
Ms. Catherine Crone, Director of Management Training
Management Sciences for Health
165 Allandale Road
Boston, Massachusetts 02130, USA

In 1973 the International Training Program was established at the **Margaret Sanger Center**, Planned Parenthood of New York City, the largest nonhospital family planning clinic in the US (157). Courses, primarily for nurses and midwives, are given in training facilities at the Center and also through technical assistance projects overseas (136). Health workers receive instruction not only as practitioners but also as potential trainers of other health workers. Emphasis is on assisting programs in Africa, Latin America, and the Caribbean (157).

Sources of funding are US AID, corporations, foundations, and individuals (26). The annual budgets for the International Training Program were approximately $450,000 in 1981 and 1982 (136). Inquiries should be sent to:

Mr. George Marshall Worthington, Director
International Training Program
Margaret Sanger Center
Planned Parenthood Federation of New York City
380 Second Avenue
New York, New York 10010, USA

Meals for Millions/Freedom from Hunger Foundation (MFM/FFH), founded in 1946, offers nutrition education and training in nonformal education techniques. This training is a major element in integrated rural development programs conducted by MFM/FFH in the US and developing countries (26). With the support of the Hewlett Foundation, MFM/FFH is investigating ways to provide technical assistance in family planning education to family planning associations and other organizations, as a component of its applied nutrition projects. Family planning constitutes approximately 10 to 15 percent of MFM/FFH activities (34). In fiscal years 1981 and 1982 MFM/FFH presented family planning training as part of nutrition courses in Antigua, Ecuador, Honduras, Kenya, St. Kitts, and Sierra Leone, often in cooperation with local IPPF affiliates (38). The total budget for all activities in 1983 is $2.2 million (34).

MFM/FFH has offices in Davis, California (for address, see p. J-651) and New York. Requests for assistance should be sent to:

Mr. Peter J. Davies, President
Meals for Millions/Freedom from Hunger Foundation
815 Second Avenue, Suite 1001
New York, New York 10017, USA

Save the Children is a voluntary, nonsectarian, nonprofit organization founded in 1932. Emphasizing help for the child within his or her environment, it provides a variety of services directly to children as well as self-help development assistance to communities in the US and 32 other countries (143). Family planning and population education activities are not a separate endeavor but are a component of integrated economic development projects (143, 157). Save the Children does not fund projects undertaken by governments or other organizations. Rather, it carries out its own projects on behalf of organizations and countries requesting assistance (157). Save the Children receives funding from many international agencies and governmental bodies, including the UN High Commissioner for Refugees, UNICEF, and US AID, and from corporations, foundations, and individuals (143).

The 1982 budget was $22 million, of which approximately $3.8 million was for integrated health/nutrition services, including family planning (45). Save the Children recently has provided family planning services and training in Bangladesh; maternal health training and women's education in Indonesia; family planning services and women's development activities in Mexico; and training of health workers in Sri Lanka (160). Applications for assistance should be sent to:

Mr. David L. Guyer, President
Save the Children
54 Wilton Road
Westport, Connecticut 06880, USA

Established in 1951, **World Education** is a private, nonprofit organization. World Education focuses on nonformal education as an approach to human resource development, including health, women's programs, and family life education. It is supported by US AID, UN organizations, private foundations, and corporations (176).

Currently, World Education is participating in a 3-year, $2.4 million program in seven countries to integrate women into the development process. Education in human sexuality is part of the women's programs in Brazil and Peru. In 1983 World Education is starting a 2-year project to explore the effect on fertility of women's participation in income-generating activities. The budget for this project, which is being conducted in the coastal region of Kenya, is $200,000, funded by US AID (105). Requests for technical assistance in family life education should be sent to:

Ms. Jeanne McCormack, Technical Associate
World Education, Inc.
210 Lincoln Street
Boston, Massachusetts 02111, USA

The **World Federation of Health Agencies for the Advancement of Voluntary Surgical Contraception (WFHA-AVSC)** is a consortium of 37 national and regional organizations with the common goals of (1) including voluntary surgical contraception as a choice within health and family planning programs; (2) expanding an international leadership network to influence national and international policies and programs; and (3) examining, comparing, and discussing internationally the social, professional, educational, legal, scientific, and service delivery issues related to voluntary surgical contraception. In pursuit of this last goal, the World Federation organizes seminars and study groups and publishes technical, programmatic, and policy materials. It also provides related technical assistance in policy development, education for professionals, and fundraising. The World Federation welcomes queries or ideas from developing-country organizations for collaborative efforts concerning regional and international projects in these areas.

The organization was established in 1975 and receives a major portion of its funding from the Association for Voluntary Sterilization. The general budget in 1982 was approximately $600,000 (20). For further information contact:

Ms. Beth S. Atkins, Director
World Federation Secretariat
122 East 42nd Street
New York, New York 10168, USA

ADDRESSES OF REGIONAL AND FIELD OFFICES

INTERNATIONAL DEVELOPMENT RESEARCH CENTRE (IDRC)

East Africa
B.P. 11007
Dakar CD Annexe
Senegal

West Africa
P.O. Box 62084
Nairobi, Kenya

Asia
Tanglin P.O. Box 101
Singapore 9124

Latin America
Apartado Aéreo 53016
Bogotá, Colombia

Middle East & North Africa
P.O. Box 14 Orman
40 El Messaha Street
Dokki—Giza
Cairo, Egypt

UN REGIONAL COMMISSIONS

Economic Commission for Europe (ECE)
Palais des Nations
CH-1211 Geneva 10, Switzerland

Economic Commission for Africa (ECA)
P.O. Box 3001
Addis Ababa, Ethiopia

Economic and Social Commission for Asia and the Pacific (ESCAP)
United Nations Building
Rajadamnern Avenue
Bangkok 2, Thailand

Economic Commission for Latin America (ECLA)
Centro Latino-americano de Demografía (CELADE) (Headquarters)
Edificio Naciones Unidas
Avenida Dag Hammarskjold
Casilla 91
Santiago, Chile
and
Montes de Oca
Apartado Postal 5249
San José, Costa Rica

REGIONAL DEMOGRAPHIC TRAINING AND RESEARCH CENTRES

Cairo Demographic Centre
2 Lebanon Street
P.O. Box 75
Mohandisseen
Cairo, Egypt

Regional Institute for Population Studies
University of Ghana
P.O. Box 96
Legon, Ghana
(for English-speaking African countries)

Institut de formation et de recherche démographique
B.P. 1556
Yaoundé, United Republic of Cameroon
(for French-speaking African countries)

International Institute for Population Studies
Deonar
Bombay 400 088, India

Centre démographique ONU-Roumanie (CEDOR)
39, bd. Ana Ipâtescu
B.P. 550
Bucharest 1, Romania
(for other French-speaking developing countries)

Centro Latino-americano de Demografía (CELADE)
Edificio Naciones Unidas
Avenida Dag Hammarskiold
Casilla 91
Santiago, Chile

INTERNATIONAL LABOUR OFFICE (ILO)

Africa
Africa Avenue
P.O. Box 2788
Addis Ababa, Ethiopia

Asia
United Nations Building
Rajadamnern Avenue
P.O. Box 1759
Bangkok 2, Thailand

Caribbean
19 Keate Street
P.O. Box 1201
Port-of-Spain, Trinidad and Tobago

(Continued on next page)

Latin America
Las Flores 295
San Isidro
Apartado Postal 3638
Lima, Peru

Middle East
Rock and Marble Building
Ramlet-El-Beida
B.P. 114-5096
Beirut, Lebanon

UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION (UNESCO)

P.O. Box 20 Grand Central Station
New York, New York 10017, USA

Apartado Postal 4158
Vedado
La Habana, Cuba

UNESCO REGIONAL BUREAUS OF EDUCATION

Africa
B.P. 3311
Dakar, Senegal

Asia
P.O. Box 1425
Bangkok 11, Thailand

Latin America & the Caribbean
P.O. Box 3187
Santiago, Chile

Middle East
P.O. Box 5244
Beirut, Lebanon

WORLD HEALTH ORGANIZATION

Africa
P.O. Box No. 6
Brazzaville, Congo

South-East Asia
World Health House
Indraprastha Estate
Mahatma Gandhi Road
New Delhi 110 002, India

Americas
Pan American Health Organization
525 23rd Street, N.W.
Washington, D.C. 20037, USA

Eastern Mediterranean
P.O. Box 1517
Alexandria, Egypt

Europe
8, Scherfigsvej
DK-2100 Copenhagen, Denmark

Western Pacific
P.O. Box 2932
12115 Manila, Philippines

THE FORD FOUNDATION

Eastern & Southern Africa
P.O. Box 41081
Nairobi, Kenya

West Africa
P.O. Box 2368
Lagos, Nigeria

Bangladesh
P.O. Box 98
Ramna
Dacca 2, Bangladesh

South Asia
55 Lodi Estate
New Delhi 100 003, India

Southeast Asia
P.O. Box 2030
Taman Kebon
Sirih 1/4
Jakarta, Indonesia

Andean Region & Southern Cone
Casilla de Correo 6025
Lima, Peru

Brazil
Caixa Postal 49-ZC-00
Rio de Janeiro, Brazil

Mexico & Central America
Alejandro Dumas 42
México 5, D.F., Mexico

Middle East
P.O. Box 2344
Cairo, Egypt
and
P.O. Box 1794
Khartoum, Sudan

THE ASIA FOUNDATION

G.P.O. Box 666
Dacca, Bangladesh
(for Bangladesh and Nepal)

J1. Darmawangsa Raya 50
Kebayoran Baru
Jakarta Selatan, Indonesia

13-4 Shirokanedai 5-chome
Minato-ku
Tokyo 108, Japan

Gwang Wha Moon
P.O. Box 738
Seoul 110, Korea

Jalan Raja Chulan
Kuala Lumpur 05-10, Malaysia

P.O. Box 1165
Islamabad, Pakistan

P.O. Box 7072
Air Mail District Center
MIA, Philippines

3-1A Rajakeeya Mawatha
Race Course Avenue
Colombo 7, Sri Lanka

G.P.O. Box 1910
Bangkok, Thailand

(Requests from the Pacific Islands should be sent to the San Francisco office. For address, see p. J-636.)

THE POPULATION COUNCIL

Center for Biomedical Research
Rockefeller University
York Avenue at 66th Street
New York, New York 10021, USA

North Africa & West Asia
P.O. Box 115
Dokki
Cairo, Egypt

South & East Asia
P.O. Box 11-1213
Bangkok 11, Thailand

Latin America & the Caribbean
Apartado Postal 105-152
México 5, D.F., Mexico

(Requests from sub-Saharan Africa should be sent to the New York headquarters. For address, see p. J-640.)

ASSOCIATION FOR VOLUNTARY STERILIZATION (AVS)

Africa & Middle East
3 rue de Beyrouth, 2^{e} étage
Tunis, Tunisia

Asia
35 Road 12 A (New)
Dhanmondi
Dacca, Bangladesh

FAMILY HEALTH INTERNATIONAL

Africa
P.O. Box 1654
Accra, Ghana

Latin America
Apartado Aéreo 24846
Bogotá, Colombia

FAMILY PLANNING INTERNATIONAL ASSISTANCE (FPIA)

Africa
P.O. Box 53538
Nairobi, Kenya

East Asia & South Pacific
M.C.C. P.O. Box 867
Metro Manila, Philippines

South & West Asia
Box 2933
Dacca 5, Bangladesh

Latin America
8400 N.W. 52nd Street
Miami, Florida 33166, USA

INTRAH

National Family Welfare Center
Ministry of Health
Nairobi, Kenya

PATHFINDER FUND

Regional Offices:

Sub-Saharan Africa
P.O. Box 48147
Nairobi, Kenya
or
P.O. Box 4492
Harare, Zimbabwe

North Africa & Middle East
30 avenue des Arpillières
1225 Chêne Bougeries
Geneva, Switzerland

Egypt & Sudan
3 Finney Square
Dokki
Cairo, Egypt

Latin America (North)
Avenida Chile 9-55, Oficina 901
Apartado Aéreo 051142
Bogotá, Colombia

Latin America (South)
Avenida Apoquindo 2735
Depto. 801
Santiago, Chile

(Applications from South Asia and the Far East should be sent to the regional bureau at the US headquarters. For address, see p. J-645.)

Country Offices:

House No. 15
Road No. 13-A (New)
Dhanmondi R.A.
G.P.O. 2721
Dacca, Bangladesh

Rua Gamboa de Cima,
35—Apto. 101
40.000 Salvador
Bahia, Brazil

Jalan Menteng
Raya No. 9
Jakarta Pusat, Indonesia

College of Medicine, Dept. of Ob/Gyn
Family Planning Division
University College Hospital
Ibadan, Nigeria

General Vivanco 873
Lima 21, Peru

Mehtap Sokak 6-4
Goztepe
Istanbul, Turkey

PROGRAM FOR THE INTRODUCTION AND ADAPTATION OF CONTRACEPTIVE TECHNOLOGY (PIACT)

P.O. Box 2030
Jakarta, Indonesia

M.C.C. P.O. Box 189
Makati 3117
Manila, Philippines

Shakespeare No. 27
México 5, D.F., Mexico

2 rue Thalberg
CH-1201 Geneva, Switzerland

2030 M Street, Suite 700
Washington, D.C. 20036, USA

WORLD NEIGHBORS

East Africa
P.O. Box 14728
Nairobi, Kenya

South Asia
P.O. Box 916
Kathmandu, Nepal

Indonesia
Tromolpos 3
Waingapu, Sumba Timur
N.T.T., Indonesia

Central America & Mexico
Apartado 17
Nochixtlan, Oaxaca 69600, Mexico

Andean/South America
Avenida Javier Prado Este 4921, Oficina 4
Centro Comercial Camacho
Lima 13, Peru
(Requests from Eastern South America and from West Africa should be sent to the Regional Director for Latin America or Africa at headquarters in Oklahoma City. For address, see p. J-647.)

MEALS FOR MILLIONS/FREEDOM FROM HUNGER FOUNDATION (MFM/FFH)

1644 DaVinci Court
P.O. Box 2000
Davis, California 95617, USA

MAILING ADDRESSES OF INTERNATIONAL PLANNED PARENTHOOD FEDERATION REGIONAL AND FIELD OFFICES AND MEMBER ASSOCIATIONS IN DEVELOPING COUNTRIES

Region	Address
Field Offices	
Africa	Box A 30 Mbabane Swaziland
	109 rue Carnot X. Denain B.P. 1553 Dakar, Senegal
	B.P. 4101 Lomé, Togo
	P.O. Box 30234 Nairobi, Kenya
East & Southeast Asia & Oceania	G.P.O. Box 2534 Kuala Lumpur 01-02, Malaysia
Indian Ocean	16 Battisputali Katmandu, Nepal
Middle East & North Africa	P.O. Box 926520 Amman, Jordan
Regional Office	
Western Hemisphere	105 Madison Avenue New York, New York 10016, USA

Country or Area	Association
Member Associations	
Afghanistan	Afghan Family Guidance Association P.O. Box 545 Kabul, Afghanistan
Argentina	Asociación Argentina de Proteccion Familiar Aguero 1568-(1425) Buenos Aires, Argentina
Bahrain	Bahrain Family Planning Association P.O. Box 20326 Manama, Bahrain
Bangladesh	Family Planning Association of Bangladesh 2 Naya Paltan Dacca-2, Bangladesh
Barbados	Barbados Family Planning Association Bay Street Bridgetown, Barbados
Benin	Comité national du Benin pour la promotion de la famille B.P. 1486 Cotonou, Benin
Bermuda	Chief Medical Officer Department of Health P.O. Box 380 Hamilton, Bermuda
Bolivia	Centro de Orientación Familiar Casilla Expresa 7522 La Paz, Bolivia
Botswana	Ministry of Finance & Development Planning Private Bag 8 Gaborone, Botswana
Brazil	Sociedade Civil de Bem-Estar Familiar no Brazil Rua Esmeraldino Bandeira No. 120 Estação do Riachuelo Rio de Janeiro RJ, Brazil
Caribbean	Caribbean Family Planning Affiliation P.O. Box 419 St. Mary's Street St. John's, Antigua
Chile	Asociación Chilena de Protección de la Familia Casilla 16504 Correo 9—Providencia Santiago, Chile
China	China Family Planning Association Xi Zhi Men 2 Nan Shun Cheng Beijing, China
Colombia	Asociación Pro-Bienestar de la Familia Colombiana Calle 34, No. 14–52 Bogotá, Colombia
Costa Rica	Asociación Demográfica Costarricense Apartado Postal 10203 San Jose, Costa Rica
Cyprus	Family Planning Association of Cyprus 25 Bouboulinas Street Nicosia, Cyprus
Dominican Republic	Asociación Dominicana Pro-Bienestar de la Familia, Inc. Apartado Postal 1053 Zona Postal 1 Santo Domingo, D.N., Dominican Republic
Ecuador	Asociación Pro-Bienestar de la Familia Ecuatoriana Apartado Postal 5954 Guayaquil, Ecuador
Egypt	Egyptian Family Planning Association 5 Talaat Harb Street Cairo, Egypt
El Salvador	Asociación Demográfica Salvadoreña Apartado Postal (06) 1338 San Salvador, El Salvador
Ethiopia	Family Guidance Association of Ethiopia P.O. Box 5716 Addis Ababa, Ethiopia
Fiji	Family Planning Association of Fiji, Inc. P.O. Box 619 Suva, Fiji
Gambia	Family Planning Association of the Gambia P.O. Box 325, Kanifing Banjul, Gambia
Ghana	Planned Parenthood Association of Ghana P.O. Box 5756 Farrar Avenue Accra, Ghana
Guatemala	Asociación Pro-Bienestar de la Familia de Guatemala 9a Calle 0–57, Zona 1 Apartado Postal 1004 Ciudad de Guatemala, Guatemala
Honduras	Asociación Hondureña de Planificación de la Familia Apartado Postal 625 Tegucigalpa, D.C., Honduras
Hong Kong	Family Planning Association of Hong Kong 186–192 Lockhart Road Hong Kong
India	Family Planning Association of India Bajaj Bhavan Nariman Point Bombay 400 021, India
Indonesia	The Indonesian Planned Parenthood Association P.O. Box 18 KBY Jalan Hang Jebat III/F.3 Kebrayoran Baru Jakarta Selatan, Indonesia
Iraq	The Iraqi Family Planning Association P.O. Box 6028 Mansour City Baghdad, Iraq
Jamaica	Jamaica Family Planning Association Ltd. P.O. Box 92 St. Ann's Bay, Jamaica
Jordan	Jordan Family Planning & Protection Association P.O. Box 19999 Jerusalem
	Jordan Family Planning & Protection Association P.O. Box 8066 Amman, Jordan

IPPF Member Associations (continued)

Country or Area	Association
Kenya	Family Planning Association of Kenya P.O. Box 30581 Nairobi, Kenya
Korea, Republic of	Planned Parenthood Federation of Korea C.P.O. Box 3360 Seoul, Korea
Lebanon	Lebanon Family Planning Association P.O. Box 118240 Beirut, Lebanon
Lesotho	Lesotho Planned Parenthood Association P.O. Box 340 Maseru 100, Lesotho
Liberia	Family Planning Association of Liberia P.O. Box 938 Monrovia, Liberia
Madagascar	Fianakaviana Sambatra B.P. 703 Tananarive, Madagascar
Malaysia	Federation of Family Planning Associations, Malaysia 81 A Jalan SS 15/5A Subang Jaya Selangor, Malaysia
Mali	Association malienne pour la protection et la promotion de la famille B.P. 105 Bamako, Mali
Mauritius	The Mauritius Family Planning Association 30 Desforges Street Port Louis, Mauritius
Mexico	Fundación para Estudios de la Población, A.C. Calle Juarez 208 Tlalpan México 22 DF, Mexico
Morocco	Association marocaine de planification familiale B.P. 1217 RP 6 Ibn El-Cadi Quartier des Orangers Rabat, Morocco
Nepal	Family Planning Association of Nepal P.O. Box 486 Katmandu, Nepal
Nicaragua	Asociación Demográfica Nicaragüense Apartado Postal 4220 Managua, Nicaragua
Nigeria	Planned Parenthood Federation of Nigeria PMB 12657 2 Akinmade Street Anthony Village Ikorodu Road Lagos, Nigeria
Pakistan	Family Planning Association of Pakistan Family Planning House 3-A Temple Road Lahore, Pakistan
Panama	Asociación Panemeña para el Planeamiento de la Familia Apartado Postal 4637 Panama 5, Panama
Paraguay	Centro Paraguayo de Estudios de Población Edificio "El Dorado" 8° piso Juan E. O'Leary y Manduvira Asuncion, Paraguay
Peru	Instituto Peruano de Paternidad Responsable Intisuyo 371 Urb. Maranga, San Miguel Lima, Peru
Philippines	Family Planning Organization of the Philippines, Inc. P.O. Box 1279 Manila, Philippines
Senegal	Association sénégalaise pour le bien-être familial B.P. 6084 Dakar, Senegal
Sierra Leone	Planned Parenthood Association of Sierra Leone P.O. Box 1094 Freetown, Sierra Leone
Singapore	Family Planning Association of Singapore Singapore Council of Social Service 11 Penang Lane (Room 4D) Singapore 9
Sri Lanka	Family Planning Association of Sri Lanka P.O. Box 365 Colombo 7, Sri Lanka
Sudan	Sudan Family Planning Association P.O. Box 170 Khartoum, Sudan
Swaziland	Ministry of Health P.O. Box 5 Mbabane, Swaziland
Syria	Syria Family Planning Association P.O. Box 2282 Damascus, Syria
Tanzania	UMATI (Uzazi Na Malezi Bora Tanzania) P.O. Box 1372 Dar es Salaam, Tanzania
Thailand	Planned Parenthood Association of Thailand No. 8 Soi Dai Dee Vibhanadi-Yao Bangkhen Bangkok 9, Thailand
Togo	Association togolaise pour le bien-être familial B.P. 4056 Lome, Togo
Trinidad & Tobago	Family Planning Association of Trinidad & Tobago 141 Henry Street Port of Spain, Trinidad & Tobago
Tunisia	Association tunisienne du planning familial 6 rue Amine Er-Raihani 1005 El Omrane Tunis, Tunisia
Turkey	Türkiye Aile Plânlamasi Derneği Ataç, Sokak No. 73/3 Ankara, Turkey
Uganda	Family Planning Association of Uganda P.O. Box 30030 Kampala, Uganda
Uruguay	Asociación Uruguaya de Planificación Familiar e Investigaciones sobre Reproducción Humana Casilla de Correo No. 10.634 Distrito 1 Montevideo, Uruguay
Yemen Arab Republic	Yemen Family Planning Association P.O. Box 795 Al Tahreer Square San'a, Yemen
Zaire	Comité national des naissances désirables B.P. 15.313 Kinshasa, Zaire
Zambia	Planned Parenthood Federation of Zambia P.O. Box 32221 Lusaka, Zambia

BIBLIOGRAPHY

Asterisk (*) designates an article that was of particular value in the preparation of this issue of **Population Reports**.

1. ANONYMOUS. Assessment of ASEAN population program. Asian-Pacific Population Programme News 11(1,2): 15-18. 1982.

2. ANONYMOUS. Introducing ICSMP: the International Contraceptive Social Marketing Project. Social Marketing Update 1(1): 1. April 1981.

3. ANONYMOUS. Italy agrees $4.585 million for projects. Population—UNFPA Newsletter 8(12): 1. December 1982.

*4. ANONYMOUS. Major private organizations in the population field. Population, No. 10. Washington, D.C., Population Crisis Committee, July 1982. 12 p.

5. ANONYMOUS. 1980 ASEAN programme roundup. a model in the making. Asian-Pacific Population Programme News 10(1,2): 25-28. 1981.

6. ANONYMOUS. Partners gets AID grant for Women in Development work. Partners 14(4): 1. September-October 1982.

7. ANONYMOUS. Partners' session spurs progress for Latin women. Front Lines 20(5): 8. February 18, 1982.

8. ANONYMOUS. The next hundred years. Population—UNFPA Newsletter 8(4): 1. April 1982.

9. ANONYMOUS. UNFPA reports on 1981: highlights of the year. Population—UNFPA Newsletter 8(6): 3-4. June 1982.

10. ALEXANDER, B. [General Service Foundation] [General Service Foundation activities] Personal communication, October 2, 1982. 7 p.

11. ASEAN POPULATION COORDINATION UNIT, MALAYSIA. NATIONAL FAMILY PLANNING BOARD. The Pre-Implementation Meeting of Phase-Two ASEAN Population Programme, Penang, Malaysia, 2-6 September 1980: proceedings of meeting. Vol. 1. Kuala Lumpur, Malaysia, National Family Planning Board, [1981]. 53 p.

12. ASEAN POPULATION COORDINATION UNIT, MALAYSIA NATIONAL FAMILY PLANNING BOARD. The Pre-Implementation Meeting of Phase-Two ASEAN Population Programme, Penang, Malaysia, 2-6 September 1980: revised project proposals. Vol. 2. Kuala Lumpur, Malaysia, National Family Planning Board, [1981]. 330 p.

13. ASIA FOUNDATION. The president's review and annual report 1979. San Francisco, California, Asia Foundation, [1980]. 88 p.

14. ASIA FOUNDATION. The president's review and annual report 1980. San Francisco, California, Asia Foundation, [1981]. 91 p.

15. ASIA FOUNDATION. The president's review, 1981. [San Francisco, California], Asia Foundation, [1982]. 91 p.

16. ASIAN CENTRE FOR POPULATION AND COMMUNITY DEVELOPMENT. 1981 annual report. Bangkok, Thailand, Population and Community Development Association, [1981]. 78 p.

17. ASSOCIATION FOR POPULATION/FAMILY PLANNING LIBRARIES AND INFORMATION CENTERS INTERNATIONAL (APLIC-INTERNATIONAL). [APLIC-International activities]. [Brochure] Clarion, Pennsylvania, APLIC-International, [1981]. 4 p.

18. ASSOCIATION FOR POPULATION/FAMILY PLANNING LIBRARIES AND INFORMATION CENTERS INTERNATIONAL (APLIC-INTERNATIONAL). Proceedings of the Fourteenth Annual Conference. New York, APLIC-International, 1982. 159 p.

19. ASSOCIATION FOR VOLUNTARY STERILIZATION (AVS). 1981 annual report. New York, AVS, [1982]. 27 p.

20. ATKINS, B. [World Federation of Health Agencies for the Advancement of Voluntary Surgical Contraception (WFHA-AVSC)] [WFHA-AVSC budget] Personal communication, December 9, 1982.

21. AUSTRALIAN DEVELOPMENT ASSISTANCE BUREAU. Australia's overseas development assistance program: 1982-83. Canberra, Australian Government Publishing Service, 1982. (1982-83 Budget Paper No. 9) 17 p.

22. AUSTRALIAN DEVELOPMENT ASSISTANCE BUREAU (ADAB). DEPARTMENT OF FOREIGN AFFAIRS. ADAB annual review 1980-81. Development co-operation: Australia's program of support for social and economic development in the Third World. Canberra, Australian Government Publishing Service, 1982. 58 p.

23. AUSTRALIAN DEVELOPMENT ASSISTANCE BUREAU. DEPARTMENT OF FOREIGN AFFAIRS. Development co-operation: Australia's program of support for social and economic development in the Third World. Bilateral program 1981-82. Canberra, Australian Government Publishing Service, 1981. 98 p.

24. BEDNAR, J.F. The population factor. Agenda 5(3): 21-23. April 1982.

25. BLOUSE, J. [Johns Hopkins Program for International Education in Gynecology and Obstetrics (JHPIEGO)] [JHPIEGO budget] Personal communication, September 22, 1982.

26. BOYNES, W., ed. US non-profit organizations in development assistance abroad: TAICH [Technical Assistance Information Clearing House] directory 1978. New York, American Council of Voluntary Agencies for Foreign Service, TAICH, 1979. 525 p.

27. BRADSHAW, L.E. and GREEN, C.P. A guide to sources of family planning program assistance. Population Reports, Series J, No. 15. Washington, D.C., Population Information Program, April 1974. 24 p.

28. CENTER FOR HUMAN SERVICES. PRICOR (Primary Health Care Operations Research) project. [Brochure] Chevy Chase, Maryland, Center for Human Services, January 1983.

29. CENTRE FOR DEVELOPMENT AND POPULATION ACTIVITIES (CEDPA). 1981 annual report. Washington, D.C., CEDPA, [1982]. 20 p.

30. CHASE, H. [Association for Voluntary Sterilization (AVS)] [AVS budget for 1982] Personal communication, August 23, 1982. 1 p.

31. CHEN, P.C. [Wayne State University] [Birth planning expenditures in China] Personal communication, February 3, 1983.

32. COIT, E. [Unitarian Universalist Service Committee (UUSC)] [UUSC activities and budget] Personal communication, November 19, 1982. 1 p.

33. COLUMBIA UNIVERSITY. CENTER FOR POPULATION AND FAMILY HEALTH (CPFH). [Report of activities]. New York, CPFH, [1982]. 53 p. (Mimeo)

34. COX, B. [Meals for Millions/Freedom from Hunger Foundation (MFM/FFH)] [Description of MFM/FFH family planning component] Personal communication, November 16, 1982.

35. CRANE, B.B. and FINKLE, J.L. Organizational impediments to development assistance: the World Bank's population program. World Politics 33(4): 516-553. July 1981.

36. CURTIS, B. [World Neighbors] [World Neighbors allocations to family planning projects] Personal communication, September 14, 1982. 8 p.

37. DANISH INTERNATIONAL DEVELOPMENT AGENCY (DANIDA). MINISTRY OF FOREIGN AFFAIRS. Denmark's development assistance. Annual report 1981. Copenhagen, DANIDA, 1982. 40 p.

38. DAVIES, P.J. [Meals for Millions/Freedom from Hunger Foundation (MFM/FFH)] [Description of MFM/FFH activities] Personal communication to A.F. Murray, April 23, 1982. 13 p.

39. DENNIS, F. International Planned Parenthood Federation. In: Ross, J.A., ed. International encyclopedia of population. Vol. 1. New York, Free Press, 1982. p. 373-374.

40. DENNIS, F. [International Planned Parenthood Federation (IPPF)] [IPPF budgets] Personal communication, November 20, 1982. 1 p.

41. DENNISON, E.S. [Development Associates] [Development Associates activities] Personal communication, November 24, 1982. 2 p.

42. DEVELOPMENT ASSOCIATES. Progress report: training for PAC personnel in the Latin America/Caribbean region. April 1 through September 30, 1981. Arlington, Virginia, Development Associates, 1981. (Contract No. DSPE-C-0060) 57 p.

43. DEVELOPMENT ASSOCIATES. Progress report: training for PAC personnel in the Latin America/Caribbean region. October 1, 1981 through March 31, 1982. Arlington, Virginia, Development Associates, 1982. (Contract No. DSPE-C-0060) 47 p.

44. DINES, T.K. [United Kingdom Overseas Development Administration (ODA)] [ODA budget for population activities] Personal communication, September 24, 1982. 1 p.

45. DOBYNS, P. [Save the Children] [Save the Children population activities] Personal communication, December 8, 1982.

46. DOCTOR, K.C. [International Labour Office (ILO)] [ILO activities and 1982 budget] Personal communication, November 3, 1982. 2 p.

47. EAST-WEST POPULATION INSTITUTE. Bulletin 1980. Honolulu, Hawaii, East-West Center, [1981]. 13 p.

48. FAMILY PLANNING INTERNATIONAL ASSISTANCE (FPIA). Annual report: program year 10. New York, FPIA, [1982]. 171 p.

49. FEDERAL REPUBLIC OF GERMANY. MINISTRY FOR ECONOMIC COOPERATION. [West German population assistance, 1981 and 1982] Personal communication from Eberhard Killinger, February 1, 1983.

50. FINKLE, J.L. and CRANE, B.B. The World Health Organization and the population issue: organizational values in the United Nations. Population and Development Review 2(3-4): 367-393. September-December 1976.

51. FINLAND. MINISTRY FOR FOREIGN AFFAIRS. [Finnish population assistance, 1982] Personal communication, January 18, 1983. 3 p.

52. FOOD AND AGRICULTURE ORGANIZATION (FAO). Planning for the future with people. [New York], FAO, [1980]. 29 p.

53. FORD FOUNDATION. Annual report: October 1, 1979 to September 30, 1980. New York, Ford Foundation, 1981. 79 p.

54. FORD FOUNDATION. Current interests of the Ford Foundation: 1982 and 1983. New York, Ford Foundation, [1982]. 16 p.

55. FUTURES GROUP. The effects of population factors on social and economic development. RAPID: Resources for the Awareness of Population Impacts on Development. [Brochure] Glastonbury, Connecticut, Futures Group, April 1981.

*56. GILLE, H. International population assistance. In: Ross, J.A., ed. International encyclopedia of population. Vol. 1. New York, Free Press, 1982. p. 374-382.

57. GILLE, H. Overview of international population assistance. New York, United Nations Fund for Population Activities, [1980]. 10 p. (Mimeo)

58. GRAF, C. [Directorate of Development Cooperation and Humanitarian Aid, Switzerland] [Swiss population assistance] Personal communication, January 20, 1983. 4 p.

*59. GREEN, C.P. International population assistance: trends in donor allocations, rationale for U.S. involvement, and overview of AID's population program. Washington, D.C., Population Crisis Committee, September 1981. 16 p. (Mimeo)

60. GREEN, M. and FEAREY, R.A. World population: the silent explosion. Department of State Bulletin, Fall 1978. p. 1-32.

61. HARKAVY, O. [Ford Foundation] [Ford Foundation activities and 1982 budget] Personal communication, November 23, 1982. 1 p.

62. HASHIM, R. [International Committee on the Management of Population Programmes (ICOMP)] [ICOMP budget for 1982] Personal communication, November 11, 1982.

63. HEMMER, C. [US Agency for International Development] [International population assistance] Personal communication, December 6, 1982.

64. HEMMER, C. [US Agency for International Development] Long-term view of AID allocations for population assistance. Memorandum, October 29, 1982. 6 p. (Unpublished, limited availability)

*65. HEMMER, C.J. [US Agency for International Development] [Worldwide population assistance] Personal communication to F. Pinkham, April 10, 1982. 4 p.

66. HENDERSON, J. Summary of significant findings from visits to United Kingdom, Sweden and Norway: September 22-30, 1982. October 1982. 11 p. (Unpublished)

67. HEWLETT FOUNDATION. The William & Flora Hewlett Foundation annual report 1981. Menlo Park, California, Hewlett Foundation, [1982]. 97 p.

68. INTERNATIONAL DEVELOPMENT RESEARCH CENTRE (IDRC). Annual report 1981-1982. Ottawa, Canada, IDRC, 1982. 63 p.

69. INTERNATIONAL DEVELOPMENT RESEARCH CENTRE (IDRC). Projects 1970-1981. Ottawa, Canada, IDRC, 1982. 63 p.

70. INTERNATIONAL DEVELOPMENT RESEARCH CENTRE (IDRC). Searching: review of IDRC activities 1979. Ottawa, Canada, IDRC, 1980. 41 p.

71. INTERNATIONAL DEVELOPMENT RESEARCH CENTRE (IDRC). Searching: review of IDRC activities 1981. Ottawa, Canada, IDRC, 1982. 40 p.

72. INTERNATIONAL FEDERATION FOR FAMILY LIFE PROMOTION (IFFLP). Annual report 1980. Washington, D.C., IFFLP, 1981. 7 p.

73. INTERNATIONAL FERTILITY RESEARCH PROGRAM (IFRP). 1981 annual report. Research Triangle Park, North Carolina, IFRP, [1982]. 13 p.

74. INTERNATIONAL PLANNED PARENTHOOD FEDERATION (IPPF). Community family planning services in IPPF. London, IPPF, December 1981. 24 p.

75. INTERNATIONAL PLANNED PARENTHOOD FEDERATION (IPPF). Report to donors: 1981. Programme development and financial statements: 1980-1982. London, IPPF, 1981. 242 p.

76. INTERNATIONAL PLANNED PARENTHOOD FEDERATION (IPPF). Report to donors: 1982. Programme development and financial statements 1981-1983. London, IPPF, October 1982. 254 p.

77. INTERNATIONAL PLANNED PARENTHOOD FEDERATION (IPPF). Summaries of research projects carried out in 1981. [London], IPPF, [1982]. 29 p. (Mimeo)

78. INTERNATIONAL STATISTICAL INSTITUTE (ISI). World Fertility Survey Conference, July 7-11, 1980. [Program] London, ISI, 180. 39 p.

79. INTRAH—Program for International Training in Health. [INTRAH activities]. [Brochure] Chapel Hill, North Carolina, University of North Carolina, [1981]. 15 p.

80. INTRAH—Program for International Training in Health. Semiannual report #5: October 1, 1982-March 31, 1982. Chapel Hill, North Carolina, University of North Carolina, 1982. (Contract No. AID/DSPE-C-0058) 72 p.

81. ISAACS, S.L. Report on the Asian Center for Population and Community Development. April 1982. 12 p. (Unpublished)

82. ISRAEL, R.A. [National Center for Health Statistics (NCHS)] [NCHS population activities] Personal communication, September 3, 1982. 5 p.

83. JAPAN INTERNATIONAL COOPERATION AGENCY. [Japanese population assistance] Personal communication, December 3, 1982. 2 p.

84. JAPANESE ORGANIZATION FOR INTERNATIONAL COOPERATION IN FAMILY PLANNING (JOICFP). [JOICFP activities and 1982 budget] Personal communication, November 15, 1982.

85. JENNINGS, V.H. [Development Associates, Inc.] [Development Associates activities and budget] Personal communication, October 6, 1982. 7 p.

86. JOHNS HOPKINS PROGRAM FOR INTERNATIONAL EDUCATION IN GYNECOLOGY AND OBSTETRICS (JHPIEGO). Annual report of the JHPIEGO Corporation, fiscal year 1981. [Baltimore, Maryland], JHPIEGO, [1982]. 52 p.

87. KANAWATI, N. [United Nations Children's Fund (UNICEF)] [UNICEF activities and budget] Personal communication, September 29, 1982. 2 p.

88. KESSLER, A. and PETROS-BARVAZIAN, A. [World Health Organization (WHO)] [WHO activities and budget] Personal communication, November 17, 1982. 1 p.

89. KESSLER, S. [American Public Health Association (APHA)] [APHA population activities] Personal communication, September 29, 1982. 2 p.

90. KNAUFF, L.K. [INTRAH—Program for International Training in Health] [INTRAH activities and budget] Personal communication, November 17, 1982. 2 p.

91. KNOWLES, J.C. Semi-annual report, year 3: 1 October 1981-31 March 1982. integrated population-development planning. Research Triangle Park, North Carolina, Research Triangle Institute, 1982. (Project No. AID/DSPE-C-0062) 85 p.

92. KOCHER, J. [Battelle Human Affairs Research Centers] [Population and Development Policy Program] Personal communication, September 17, 1982.

93. KRIER-MORROW, D. [Program for Applied Research on Fertility Regulation (PARFR)] [PARFR activities and budget] Personal communication, September 23, 1982.

94. LANCTOT, C.A. [International Federation for Family Life Promotion (IFFLP)] [IFFLP activities and budget] Personal communication, September 22, 1982. 2 p.

95. LANEGRAN, D. [General Service Foundation] [General Service Foundation budget for 1982 and 1983] Personal communication, November 15, 1982.

96. LASHER, C. [Population Crisis Committee (PCC)/Draper Fund] [PCC budget] Personal communication, September 15, 1982. 1 p.

97. LAURO, D. [Columbia University Center for Population and Family Health (CPFH)] [CPFH activities and 1982 budget] Personal communication, November 11, 1982. 3 p.

98. LENAERTS, R. [Administration Générale de la Co-opération au Développement (AGCD)] [Belgian population assistance] Personal communication, October 20, 1982. 1 p.

99. LÉON, B.D. DE. [Association of South-East Asian Nations (ASEAN) Population Coordination Unit] [ASEAN population program] Personal communication, November 26, 1982. 3 p.

100. LEWIS, G. [Westinghouse Health Systems] [Demographic Data for Development project] Personal communication, October 28, 1982.

101. LIEBER, E. [CARE] [CARE population activities] Personal communication, December 8, 1982.

102. LIPTON, M. and SHAKOW, A. The World Bank and poverty. Finance & Development 19(2): 16-19. June 1982.

103. LOVINK, T. [International Development Research Centre (IDRC)] [IDRC activities and budget] Personal communication, December 10, 1982. 1 p.

104. MAULDIN, W.P. [Rockefeller Foundation] [Rockefeller Foundation population activities and budget] Personal communication, December 14, 1982.

105. MCCORMACK, J. [World Education] [World Education activities and population budget] Personal communication, November 29, 1982.

106. MEALS FOR MILLIONS/FREEDOM FROM HUNGER (MFM/FFH) FOUNDATION. Highlights of 1981. [Brochure] New York, MFM/FFH, 1982.

107. MELLON FOUNDATION. Report of the Andrew W. Mellon Foundation 1981. New York, Mellon Foundation, [1982]. 94 p.

108. MENON, P. [United Nations (UN) Population Division] [UN population activities] Personal communication, December 8, 1982.

109. MILLER, D. [Centre for Development and Population Activities (CEDPA)] [CEDPA expenditures] Personal communication, September 20, 1982.

110. MUNCK, E. [Swedish International Development Authority] [Swedish population assistance in 1982] Personal communication, November 18, 1982. 1 p.

111. MURRAY, A.F. [Hewlett Foundation] [Hewlett Foundation grants for 1982] Personal communication, November 5, 1982.

112. NOBBE, C. [Canadian International Development Agency (CIDA)] [CIDA population activities] Personal communication, December 8, 1982.

113. NORTMAN, D.L. and FISHER, J. Population and family planning programs: a compendium of data through 1981. New York, Population Council, 1982. 96 p.

114. NORWEGIAN AGENCY FOR INTERNATIONAL DEVELOPMENT (NORAD). Agreement between the Government of the Kingdom of Norway and the Government of the Republic of India concerning an extension of the All India Hospitals (Post-partum) Family Welfare Programme to 50 sub-district hospitals. [Oslo, NORAD], 1981. 14 p.

115. NORWEGIAN AGENCY FOR INTERNATIONAL DEVELOPMENT (NORAD). Grant agreement (Bangladesh Second Population and Family Health Project) between the Government of the Kingdom of Norway and the Government of the People's Republic of Bangladesh. [Oslo, NORAD], 1980-81. 12 p.

116. NORWEGIAN AGENCY FOR INTERNATIONAL DEVELOPMENT (NORAD). [Norwegian population assistance] Personal communication, December 8, 1982. 1 p.

117. NOTZON, S. [National Center for Health Statistics (NCHS)] [NCHS estimated budget for 1983] Personal communication, November 12, 1982.

*118. O'CONNOR, M. [United Nations Fund for Population Activities] [International population assistance] Personal communication, December 1982–January 1983.

119. O'CONNOR, R. [Management Sciences for Health (MSH)] [MSH activities and 1982 budget] Personal communication, December 1, 1982.

120. OFSTAD, I. [Norwegian Agency for International Development (NORAD)] [NORAD expenditures for population] Personal communication, October 20, 1982. 2 p.

121. OGDEN, C. [Regional Training Service Agency (RTSA)/Asia] [RTSA/Asia activities and budgets] Personal communication, November 23, 1982.

122. OVERSEAS DEVELOPMENT ADMINISTRATION (ODA). Further ODA support for population activities. [London, Her Majesty's Stationery Office, 1982]. 2 p.

123. OVERSEAS DEVELOPMENT ADMINISTRATION. Report of population activities. London, Her Majesty's Stationery Office, June 1980. (Overseas Development Paper No. 21) 38 p.

124. OVERSEAS EDUCATION FUND (OEF). WIDTech. [Brochure] Washington, D.C., OEF, 1982. 10 p.

125. PAN AMERICAN HEALTH ORGANIZATION (PAHO). [PAHO activities and 1982-83 budget] Personal communication, November 9, 1982. 1 p.

126. PARTNERS OF THE AMERICAS. Integrating family life education into Partners of the Americas' programs. Proposal submitted to the William & Flora Hewlett Foundation, June 10, 1982. 7 p. (Unpublished)

127. PATHFINDER FUND. Annual report: fiscal year 1980. [Boston], Pathfinder Fund, [1981]. 130 p.

128. PATHFINDER FUND. Annual report: fiscal year 1981. [Boston], Pathfinder Fund, 1982. 130 p.

129. PATHFINDER FUND. [Pathfinder Fund activities] Chestnut Hill, Massachusetts, Pathfinder Fund, 1980. 14 p.

130. POPULATION CONCERN. Report to donors 1981. London, Population Concern, [1982]. 16 p.

131. POPULATION COUNCIL. 1981 annual report. New York, Population Council, [1982]. 80 p.

132. POPULATION CRISIS COMMITTEE (PCC)/DRAPER FUND. Report of activities 1980-81. Washington, D.C., PCC, 1982. 29 p.

133. POULSEN, B. [Danish International Development Agency (DANIDA)] [DANIDA population activities and expenditures] Personal communication, September 14, 1982. 2 p.

134. PRICE WATERHOUSE. The Pathfinder Fund financial statements, June 30, 1982. 1982. 9 p. (Unpublished)

135. PROGRAM FOR THE INTRODUCTION AND ADAPTATION OF CONTRACEPTIVE TECHNOLOGY (PIACT). [Description of PIACT]. [Brochure] Seattle, Washington, PIACT, [1982]. 14 p.

136. PURDY, P. [Margaret Sanger Center] [International Training Program activities and 1982 budget] Personal communication, August 27, 1982.

137. REESE, W.S. [Partners of the Americas] [Women in Development program] Personal communication, November 16, 1982.

138. RINGNALDA, G. [Dutch mission to the United Nations] [Dutch population assistance, 1981 and 1982] Personal communication, February 3, 1983.

139. ROCKEFELLER FOUNDATION. The president's review and annual report: 1981. New York, Rockefeller Foundation, 1982. 128 p.

140. RODRIGUEZ, I. [Family Life and Population Program/Church World Service (FLPP/CWS)] [FLPP/CWS 1982 budget] Personal communication, September 2[illegible] 1982.

141. SALAS, R.M. People: an international choice. The multilateral approach to population. Oxford, England, Pergamon Press, 1976. 154 p.

*142. SALAS, R.M. United Nations Fund for Population Activities. In: Ross, J.A., ed. International encyclopedia of population. Vol. 2. New York, Free Press, 1982. p. 643-645.

143. SAVE THE CHILDREN. Annual report 81. [Westport, Connecticut], Save the Children, [1982]. 36 p.

144. SCALLY, M.I. [US Department of Health and Human Services, Centers for Disease Control (CDC)] [CDC population activities] Personal communication, September 1[illegible], 1982. 2 p.

145. SCOTT, M. [Research Triangle Institute] [Integrated Population and Development Planning Program activities] Personal communication, November 19, 1982.

*146. SPEIDEL, J.J. Cost implications of population stabilization. Presented at International Workshop on Cost-Effectiveness Analysis and Cost-Benefit Analysis in Family Planning Programs, St. Michaels, Maryland, August 17-20, 1981. 11 p. (Unpublished)

147. SZENDIUCH, A. [Pathfinder Fund] [Asian Centre for Population and Community Development budgets] Personal communication, November 29, 1982.

148. TABAH, L. and ZAINOEDDIN, F. United Nations. In: Ross, J.A., ed. International encyclopedia of population. Vol. 2. New York, Free Press, 1982. p. 637-643.

149. TERBORGH, A. [Development Associates] [Latin American regional training program] Personal communication, September 16, 1982.

150. UNITED NATIONS. GENERAL ASSEMBLY. Resolution 3019 (XXVII). United Nations Fund for Population Activities (UNFPA) In: UNFPA. 1980 Report by the Executive Director of the United Nations Fund for Population Activities. New York, UNFPA, [1981]. p. 164-165.

151. UNITED NATIONS (UN). POPULATION DIVISION. Fertility and family planning research during 1980-82, Population Division, United Nations. New York, UN, 1982. 14 p. (Mimeo)

152. UNITED NATIONS CHILDREN'S FUND (UNICEF). Annual report 1981. New York, UNICEF, [1981]. 56 p.

153. UNITED NATIONS CHILDREN'S FUND (UNICEF). UNICEF and responsible parenthood. [Brochure] Toronto, UNICEF Canada, [1982].

154. UNITED NATIONS DEVELOPMENT PROGRAMME (UNDP). Memorandum. Trip report: 1982 UNDP Governing Council review of UNFPA. June 21, 1982. 19 p. (Unpublished)

155. UNITED NATIONS FUND FOR POPULATION ACTIVITIES (UNFPA). Guide to sources of international population assistance. New York, UNFPA, 1976. (Population Programmes and Projects, Vol. 1) 319 p.

156. UNITED NATIONS FUND FOR POPULATION ACTIVITIES (UNFPA). Guide to sources of international population assistance, 1979. New York, UNFPA, 1979. (Population Programmes and Projects, Vol. 1) 413 p.

*157. UNITED NATIONS FUND FOR POPULATION ACTIVITIES (UNFPA). Guide to sources of international population assistance, 1982. New York, UNFPA, 1982. (Population Programmes and Projects, Vol. 1) 339 p.

158. UNITED NATIONS FUND FOR POPULATION ACTIVITIES (UNFPA). Inventory of population projects in developing countries around the world, 1978/79. New York, UNFPA, 1980. (Population Programmes and Projects, Vol. 2) 605 p.

159. UNITED NATIONS FUND FOR POPULATION ACTIVITIES (UNFPA). Inventory of population projects in developing countries around the world, 1979/80. New York, UNFPA, 1981. (Population Programmes and Projects, Vol. 2) 666 p.

*160. UNITED NATIONS FUND FOR POPULATION ACTIVITIES (UNFPA). Inventory of population projects in developing countries around the world, 1980/81. New York, UNFPA, 1982. (Population Programmes and Projects, Vol. 2) 636 p.

161. UNITED NATIONS FUND FOR POPULATION ACTIVITIES (UNFPA). 1981 report by the Executive Director of the United Nations Fund for Population Activities. New York, UNFPA, [1982]. 204 p.

162. UNITED NATIONS FUND FOR POPULATION ACTIVITIES (UNFPA). Report on population assistance, 1979. New York, UNFPA, April 9, 1981. 21 p.

*163. UNITED NATIONS FUND FOR POPULATION ACTIVITIES (UNFPA). Report on population assistance, 1980. New York, UNFPA, November 1, 1982. 17 p.

164. UNITED NATIONS FUND FOR POPULATION ACTIVITIES (UNFPA). UNFPA: what it is, what is does. [Brochure] New York, UNFPA, [1982]. 4 p.

165. UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT (US AID). Current technical service contracts and grants active during the period October 1, 1980 through September 1981. Washington, D.C., US AID, US International Development Cooperation Agency, Office of Contract Management, [1982]. 282 p.

166. UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT (US AID). Table 300. AID population program assistance, by major function. [Washington, D.C.], US AID, [1982]. 1 p.

*167. UNITED STATES CONGRESS. OFFICE OF TECHNOLOGY ASSESSMENT. Financial support for LDC population programs. In: World population and fertility planning technologies: the next 20 years. Washington, D.C., U.S. Government Printing Office, February 1982. (OTA-HR-157) p. 173-202.

168. UNITED STATES DEPARTMENT OF COMMERCE. BUREAU OF THE CENSUS. International Statistical Programs Center. [Brochure] Washington, D.C., Bureau of the Census, [1982]. 17 p.

169. VAIL, J. [Program for the Introduction and Adaptation of Contraceptive Technology (PIACT)] [PIACT budget] Personal communication, October 8, 1982.

170. WEINTRAUB, D.R. [Family Planning International Assistance (FPIA)] [FPIA activities and budgets] Personal communication, November 16, 1982. 3 p.

171. WHITELEGGE, D. [International Statistical Institute (ISI)] [ISI activities and expenditures] Personal communication, November 18, 1982.

172. WILSON, M.A. [World Organization of the Ovulation Method (Billings) (WOOMB)] [WOOMB activities] Personal communication, December 8, 1982.

*173. WOLFSON, M. Population assistance agencies. In: Changing approaches to population problems. Paris, Development Centre of the Organisation for Economic Co-operation and Development and World Bank, 1978. p. 159-193.

174. WOLFSON, M. Profiles in population assistance: a comparative review of the principal donor agencies. September 1982. 73 p. (Unpublished draft, limited availability)

175. WORLD BANK. World Bank and population projects. [Brochure] Washington, D.C., World Bank, [1975]. 14 p.

176. WORLD EDUCATION. [Description of World Education activities] [Brochure] [New York], World Education, 1981. 4 p.

177. WORLD HEALTH ORGANIZATION (WHO). The work of WHO concerning family health. (Offprint from the Biennial Report of the Director-General for 1980-1981). Geneva, WHO, 1982. 24 p.

178. WORLD HEALTH ORGANIZATION (WHO). DIVISION OF FAMILY HEALTH. Towards a better future. maternal and child health. Geneva, WHO, 1980. 53 p.

179. WORLD HEALTH ORGANIZATION (WHO). SPECIAL PROGRAMME OF RESEARCH, DEVELOPMENT AND RESEARCH TRAINING IN HUMAN REPRODUCTION. Tenth annual report, human reproduction. Geneva, WHO, 1981. 167 p.

180. WORLD NEIGHBORS. A world of difference: 1980-81 annual report. Oklahoma City, Oklahoma, World Neighbors, [1982]. 16 p.

181. WORLD ORGANIZATION OF THE OVULATION METHOD (BILLINGS) (WOOMB). The development of the WOOMB organization. Presented at the 2nd International Congress of the International Federation for Family Life Promotion, Navan, Ireland, September 24-October 1, 1980. 5 p.

182. ZAHNER, J. [Family Life and Population Program/Church World Service (FLPP/CWS)] [FLPP/CWS activities in 1981] Personal communication, November 15, 1982. 3 p.

183. ZMUDZKI, W.R. [Australian Development Assistance Bureau (ADAB)] [ADAB population budget] Personal communication, October 1, 1982. 2 p.

ADDENDA

184. HEISEL, D. [United Nations. Population Division] [Population Division budget for 1982-83] Personal communication, December 29, 1982.

185. KANAWATI, N. [United Nations Children's Fund (UNICEF)] [Contributions to UNICEF by Japan, Norway, and Sweden] Personal communication, January 3, 1983.

186. KHAN, M.A. [Asian Development Bank (ADB)] [ADB loans for population projects] Personal communication, December 1, 1982. 21 p.

187. LEWIS, J.P. Development cooperation: efforts and policies of the members of the Development Assistance Committee. 1981 review. Paris, Organisation for Economic Co-operation and Development, November 1981. 242 p.

188. MUNCK, E. [Swedish International Development Authority] [Swedish contribution to UNICEF in 1980] Personal communication, January 18, 1983. 1 p.

189. MUNIAK, E. [US Agency for International Development] [Bangladesh planned expenditures on population and family planning] Personal communication, January 5, 1983.

190. NORWEGIAN AGENCY FOR INTERNATIONAL DEVELOPMENT. [Norwegian assistance to MCH programs through UNICEF, 1980] Personal communication, January 7, 1983.

191. O'CONNOR, M. [United Nations Fund for Population Activities] [Recent governmental and intergovernmental population assistance] Personal communication, January 7, 1983.

192. O'CONNOR, M. [United Nations Fund for Population Activities (UNFPA)] [Statement of UNFPA expenditures] Personal communication, January 6, 1983. 1 p.

193. SCHLEIMER, D. [United Nations Children's Fund (UNICEF)] [UNICEF contribution of Japan, 1980] Personal communication, January 12, 1983.

194. SMITH, J.K. [Mellon Foundation] [Mellon Foundation grants for population in 1982] Personal communication, January 6, 1983.

195. SPEIDEL, J.J. [US Agency for International Development] [Estimate of individuals' expenditures for own family planning services and supplies] Personal communication, January 4, 1983.

196. UNITED NATIONS (UN). DEPARTMENT OF INTERNATIONAL ECONOMIC AND SOCIAL AFFAIRS. POPULATION DIVISION. World population and its age-sex composition by country, 1950-2000: demographic estimation and projection as assessed in 1978. New York, UN, January 2, 1980. (ESA/P/WP.65) 188 p.

197. UNITED NATIONS FUND FOR POPULATION ACTIVITIES (UNFPA). Statement of expenditures. In: UNFPA. Financial report and audited financial statements for the years ending 31 December 1974 through 1981. New York, UNFPA, [1982].

198. UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT (US AID). AID policy paper: population assistance. Washington, D.C., US AID, Bureau for Program and Policy Coordination, September 1982. 14 p.

199. WILLIAMS, M.J. Development cooperation: efforts and policies of the members of the Development Assistance Committee. 1977 review. Paris, Organisation for Economic Co-operation and Development, November 1977. 240 p.

200. WOLFSON, M. Changing approaches to population assistance. People 6(2): 11-13. 1979.

201. WORLD BANK. Annual report 1970. [Washington, D.C., World Bank, 1970]. 118 p.

202. WORLD BANK. Annual report 1971. [Washington, D.C., World Bank, 1971]. 116 p.

203. WORLD BANK. Annual report 1972. [Washington, D.C., World Bank, 1972]. 130 p.

204. WORLD BANK. Annual report 1973. [Washington, D.C., World Bank, 1973]. 136 p.

205. WORLD BANK. Annual report 1974. [Washington, D.C., World Bank, 1974]. 142 p.

206. WORLD BANK. Annual report 1975. [Washington, D.C., World Bank, 1975]. 144 p.

207. WORLD BANK. Annual report 1976. [Washington, D.C., World Bank, 1976]. 160 p.

208. WORLD BANK. Annual report 1977. [Washington, D.C., World Bank, 1977]. 170 p.

209. WORLD BANK. Annual report 1978. [Washington, D.C., World Bank, 1978]. 186 p.

210. WORLD BANK. Annual report 1979. [Washington, D.C., World Bank, 1979]. 201 p.

211. WORLD BANK. Annual report 1980. [Washington, D.C., World Bank, 1980]. 200 p.

212. WORLD BANK. Annual report 1981. [Washington, D.C., World Bank, 1981]. 210 p.

213. WORLD BANK. Annual report 1982. [Washington, D.C., World Bank, 1982]. 206 p.

ISSN 0091-925X

INDEX TO ORGANIZATIONS

NATIONAL GOVERNMENTS

Australia, J-631
Belgium, J-631
Canada, J-630
Denmark, J-630
Finland, J-632
Germany, Federal Republic of, J-629
Japan, J-628
Netherlands, J-630
New Zealand, J-632
Norway, J-628
Sweden, J-629
Switzerland, J-631
United Kingdom, J-629
United States, J-626

INTERGOVERNMENTAL AGENCIES

Asian Development Bank (ADB), J-635
Association of South-East Asian Nations (ASEAN), J-635
Food and Agriculture Organization (FAO), J-634
International Labour Office (ILO), J-634
Pan American Health Organization (PAHO), J-634
United Nations Children's Fund (UNICEF), J-634
United Nations Educational, Scientific and Cultural Organization (UNESCO), J-634
United Nations Fund for Population Activities (UNFPA), J-632
United Nations Population Division, J-633
United Nations Population Programmes and Projects Branch, J-633
United Nations Regional Commissions, J-633
World Bank, J-635
World Health Organization (WHO), J-634

NONGOVERNMENTAL ORGANIZATIONS

American Public Health Association (APHA), J-647
Asia Foundation, J-636
Asian Centre for Population and Community Development (ACPD), J-646
Association for Population/Family Planning Libraries and Information Centers (APLIC)-International, J-646
Association for Voluntary Sterilization (AVS), J-640
Battelle Human Affairs Research Centers, J-641
CARE, J-646
Carolina Population Center, J-646
Center for Population Options, J-646
Centre for Development and Population Activities (CEDPA), J-647
Church World Service, Family Life and Population Program (FLPP/CWS), J-636
Columbia University Center for Population and Family Health (CPFH), J-641
Development Associates, J-641
East-West Center, J-641
Family Health International (FHI), J-642
Family Planning International Assistance (FPIA), J-642
Ford Foundation, J-636
Futures Group, J-642
General Service Foundation, J-637
William & Flora Hewlett Foundation, J-637
International Committee on the Management of Population Programmes (ICOMP), J-648
International Development Research Centre (IDRC), J-630
International Federation for Family Life Promotion (IFFLP), J-642
International Fertility Research Program (IFRP). See FHI, J-642
International Planned Parenthood Federation (IPPF), J-640
International Statistical Institute (ISI), J-648
INTRAH—Program for International Training in Health, J-643
Japanese Organization for International Cooperation in Family Planning (JOICFP), J-643
Johns Hopkins Population Center and Population Information Program, J-643
Johns Hopkins Program for International Education in Gynecology and Obstetrics (JHPIEGO), J-644
Management Sciences for Health (MSH), J-648
Margaret Sanger Center, J-648
Meals for Millions/Freedom From Hunger Foundation (MFM/FFH), J-648
Andrew W. Mellon Foundation, J-637
Overseas Education Fund (OEF), J-646
Oxfam, J-646
Partners of the Americas, J-644
Pathfinder Fund, J-644
Population Concern, J-637
Population Council, J-640
Population Crisis Committee (PCC)/Draper Fund, J-637
Population Reference Bureau (PRB), J-646
PRICOR—Primary Health Care Operations Research, J-646
Program for Applied Research on Fertility Regulation (PARFR), J-645
Program for the Introduction and Adaptation of Contraceptive Technology (PIACT), J-645
Regional Training Service Agency (RTSA)/Asia, J-645
Research Triangle Institute (RTI), J-645
Rockefeller Foundation, J-636
Save the Children, J-649
Transnational Family Research Institute (TFRI), J-646
Unitarian Universalist Service Committee (UUSC), J-646
Westinghouse Health Systems, J-646
World Education, J-649
World Federation of Health Agencies for the Advancement of Voluntary Surgical Contraception (WFHA-AVSC), J-649
World Neighbors, J-647
World Organization of the Ovulation Method (Billings) (WOOMB), J-647
World Young Women's Christian Association (WYWCA), J-646

RECENT POPULATION REPORTS

ORAL CONTRACEPTIVES—Series A

____ A-5, OCs—Update on Usage, Safety, and Side Effects *(A, F, P, S)*

____ A-6, Oral Contraceptives in the 1980s *(F, P, S)*

INTRAUTERINE DEVICES—Series B

____ B-3, IUDs—Update on Safety, Effectiveness, and Research *(F, P, S)*

____ B-4, IUDs: An Appropriate Choice for Many Women

STERILIZATION, FEMALE—Series C

____ C-6, Reversing Female Sterilization *(F, P, S)*

LAW AND POLICY—Series E

____ E-6, Legal Trends and Issues in Voluntary Sterilization *(F, P, S)*

BARRIER METHODS—Series H

____ H-5, Spermicides—Simplicity and Safety are Major Assets *(F, P, S)*

____ H-6, Update on Condoms—Products, Protection, Promotion

PERIODIC ABSTINENCE—Series I

____ I-3, Periodic Abstinence: How Well Do New Approaches Work? *(F, P, S)*

FAMILY PLANNING PROGRAMS—Series J

____ J-19, Community-Based and Commercial Contraceptive Distribution *(A, F, P, S)*

____ J-20, Filling Family Planning Gaps *(F, P, S)*

____ J-21, Social Marketing: Does It Work? *(F, P, S)*

____ J-22, Traditional Midwives and Family Planning *(F, P, S)*

____ J-23, Films for Family Planning Programs *(F, P, S)*

____ J-24, Breast-feeding, Fertility, and Family Planning *(F, P, S)*

____ J-25, Population and Birth Planning in the People's Republic of China

____ J-26, Sources of Population and Family Planning Assistance

ISSUES IN WORLD HEALTH—Series L

____ L-1, Tobacco—Hazards to Health and Human Reproduction *(A, F, P, S)*

____ L-2, Oral Rehydration Therapy for Childhood Diarrhea *(A, F, P, S)*

____ L-3, Community-Based Health and Family Planning

SPECIAL TOPICS—Series M

____ M-2, Voluntary Sterilization: World's Leading Contraceptive Method *(A, F, P, S)*

____ M-3, The World Fertility Survey—Current Status and Findings *(A, F, P, S)*

____ M-4, Age at Marriage and Fertility *(F, P, S)*

____ M-5, Contraceptive Prevalence Surveys: A New Source of Family Planning Data *(F, P, S)*

____ M-6, Population Education in the Schools

INDEX

____ Index 1972–1977 (to English edition only)

____ Index 1978–1980 (to English edition only)

Population Information Program, The Johns Hopkins University, 624 North Broadway, Baltimore, Maryland 21205, USA

1. Recent **Population Reports** are listed above. Check (✓) the issues you want to order in the spaces provided. **Population Reports** are free in any quantity to developing countries. In USA and other developed countries, multiple copies are $.50 each; full set of reports in print, $20.00; with binder, $25.00. Send payment in US$ with order.
2. All publications appear in English. Many are available in Arabic, French, Portuguese, and Spanish, as the abbreviations after each title indicate. Check the language you prefer: Arabic ☐, English ☐, French ☐, Portuguese ☐, Spanish ☐
3. Please type or print your name and mailing address clearly.

Last name ____________ First name ____________

Organization ____________

Address ____________

City ____________ Postal Code ____________

Country ____________

4. ☐ Send ______ copies of each future issue of **Population Reports.**

☐ I am already on the **Population Reports** mailing list.

☐ Please send me a binder (in developed countries, $5.00 for binder only).

☐ I do not want to receive **Population Reports** regularly.

5. Mail to address above.

POPLINE

POPLINE, a computerized literature search service, offers bibliographic citations and abstracts on any specific subject or field of interest from a collection of more than 100,000 documents covering all aspects of family planning and population. **In developing countries**, searches can be obtained **free of charge** by writing to either of the organizations listed below. **In the United States**, users can subscribe to **POPLINE** through the National Library of Medicine (NLM), Bethesda, MD 20209. **POPLINE** is already available at over 1,800 institutions designated as search centers of the NLM MEDLARS system. **In other developed countries**, searches can be obtained through MEDLARS search centers or, in countries with no access to MEDLARS, through either of the institutions listed below. In developed countries, searches are free to persons employed by international development and training institutions; others may be charged.

POPLINE is produced by the Population Information Program of the Johns Hopkins University, the Library/Information Program of the Center for Population and Family Health of Columbia University, and *Population Index* of Princeton University, in cooperation with the US National Library of Medicine and with financial support from the US Agency for International Development.

To request a search, please complete the following form:

Search topic: ____________

Last name: ____________ First name: ____________

Organization: ____________

Address: ____________

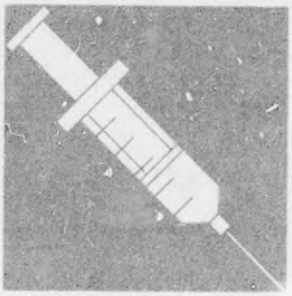
City: ____________ Postal Code: ____________ Country: ____________

Mail this form to either
of these addresses—
Services to
developing countries
free of charge.

Population Information Program
Attn: POPLINE
The Johns Hopkins University
624 North Broadway
Baltimore, Maryland 21205, USA

Center for Population and Family Health
Attn: POPLINE
Columbia University
60 Haven Avenue
New York, New York 10032, USA

5/9/83 U2520-1.23 A



Population Reports

Series K
Number 2
May 1983

INJECTABLES AND IMPLANTS

Population Information Program, The Johns Hopkins University, Hampton House, 624 North Broadway, Baltimore, Maryland 21205, USA

Long-Acting Progestins—Promise and Prospects

Editors' Summary. In the continuing search for better methods of family planning, long-acting progestins offer both promise and problems. Progestins, which are synthetic hormones that act like the natural female hormone progesterone, can be administered in at least five different ways to prevent pregnancy for extended periods of time. They make possible:

- injectable contraceptives,
- hormone-releasing IUDs,
- implants placed under the skin,
- vaginal rings, and
- once-a-month oral pills.

Different progestins are effective for different periods of time. Progestins in daily oral contraceptives are effective for only about 24 hours. The effectiveness of some progestins can be prolonged by incorporating them in an injectable solution or a carrier that gradually releases the hormone. Thus they can be effective for one month to five years or more.

Of many progestins tested, at least three have proved highly effective as long-acting contraceptives. These are:

- medroxyprogesterone acetate in its depot form (DMPA; Upjohn Company trade name, Depo-Provera),
- norethindrone enanthate (NET EN; Schering AG trade name, Noristerat), and
- levonorgestrel.

The first two are injectable preparations; the third is used in various carriers.

A major advantage of long-acting progestins is that they eliminate the need for specific action at the time of coitus, such as putting on a condom, or for daily action, such as taking a pill. At the same time, they are reversible. A major disadvantage of long-acting progestins now in use is that they disrupt the normal menstrual cycle, causing irregular bleeding, lack of menstrual periods, or, occasionally, heavier bleeding. There is no evidence that these menstrual changes pose a risk to health. In fact, to the extent that they reduce menstrual blood loss, they may reduce the risk of anemia. The major question still unresolved is whether long-term human use of certain progestins increases or decreases the risk of various cancers.

Injectable Contraceptives

Two injectable contraceptives are widely available—DMPA and NET EN. One or both have been used in about 100 countries. DMPA is usually given in a 3-month dose of 150 mg, and less often in a 6-month dose. NET EN is recommended for administration using 200 mg at either 8-week intervals or every 8 weeks for the first six months and then every 12 weeks. An estimated 2.3 million women are using DMPA. Use is most widespread in Jamaica, Thailand, Sri Lanka, and New Zealand. About 275,000 women use NET EN. International donor agencies supplied half a million to two million doses of injectables, mostly DMPA, to developing countries annually in 1978–81. Now Thailand, where about 12 percent of all contraceptors use DMPA, is purchasing supplies independently, reducing the need for donations. Monthly injectables made up of a progestin and an estrogen are used in Mexico and China.

Both DMPA and NET EN are highly effective, with annual pregnancy rates of less than one per 100 users. They have few side-effects apart from menstrual disturbances. Some women using DMPA gain weight—usually from one to five kg. Most women do not become fertile for four or five months after discontinuing use, but there is no evidence that fertility is permanently impaired. Injectables have noncontraceptive benefits. Some lactating women taking DMPA may have an increased supply of breast milk. DMPA, like oral contraceptives, reduces the risk of pelvic inflammatory disease (PID). Also, DMPA may reduce the symptoms of sickle-cell disease, a genetic disorder most common in parts of Africa and in people of African ancestry.

CONTENTS

Background K-19
Usage K-21

Injectables

  Effectiveness K-24
  Side-Effects K-26
  Effects on Reproduction K-29
  The Question of Cancer K-31
  Continuation and Acceptability K-35
  Once-a-Month Injectables K-36
Progestin-Releasing Intrauterine Devices K-37
Implants K-38
Vaginal Rings K-41
New Research on Long-Acting Methods K-42
Program Challenges K-44
Bibliography K-47

Volume XI, Number 2

This issue of Population Reports was prepared by Laurie S. Liskin, M.A., with the assistance of Wayne F. Quillin, on the basis of published and unpublished materials, correspondence, and interviews. Comments and additional material are welcome.

The assistance of the following reviewers is appreciated: L.P. Chow, Gordon Duncan, Hanni Levi Ellis, Larry Ewing, Ian S. Fraser, Henry L. Gabelnick, Ronald H. Gray, A.T. Gregoire, Peter E. Hall, Robert Hatcher, Susan E. Holck, Theodore M. King, Ursula Lachnit, Tapani Luukkainen, Edwin B. McDaniel, Malur Prasad, Sybille Meyer-Welke, Harold Nash, Gordon Perkin, Malcolm Potts, R.T. Ravenholt, Allan Rosenfield, Patrick J. Rowe, Joerg Schuppler, Pramilla Senanayake, James Shelton, Irving Sivin, J. Joseph Speidel, and Bruce Stadel.

Population Reports (USPS 063-150) is published bimonthly (January, March, May, July, September, November) at 624 North Broadway, Baltimore, Maryland 21205, USA, by the Population Information Program of The Johns Hopkins University and is supported by the United States Agency for International Development. Second class postage paid at Baltimore, Maryland. Postmaster to send address changes to **Population Reports**, Population Information Program, The Johns Hopkins University, 624 North Broadway, Baltimore, Maryland 21205, USA.

Population Reports is designed to provide an accurate and authoritative overview of important developments in the population field. It does not represent official statements of policy by The Johns Hopkins University or the US Agency for International Development.

Phyllis T. Piotrow, Ph.D., Director; Walter Stender, Associate Director; Ward Rinehart, Editor.

Injectables have proved popular in clinical trials and in countries where they are readily available commercially or through family planning programs. Continuation rates are about 50 to 75 percent at one year. Menstrual irregularities are the main reason for discontinuation.

DMPA is not sold for contraception in the United States because the US Food and Drug Administration has so far refused approval. For the same reason, the US Agency for International Development does not send supplies of DMPA to developing countries, although several international agencies do.

Concern over injectables focuses on studies in beagle dogs, which developed benign and malignant breast tumors, and studies in monkeys, which developed endometrial cancer while receiving high doses of these hormones. The relevance of these animal studies to humans has been questioned. In particular, testing hormones in dogs and at very high doses has been challenged.

Studies in humans using injectables show no increased risks of cancer. Most human studies, however, have not been large enough or have not had adequate controls or the long-term follow-up needed to produce conclusive results. An ongoing, large, multicenter case-control study conducted by the Special Programme of Research, Development and Research Training in Human Reproduction of the World Health Organization (WHO) is providing clearer answers to the cancer question. Preliminary results show no added risk of breast or cervical cancer with DMPA use. (Other large-scale studies, sponsored by the Upjohn Company, are underway in New Zealand and Kenya.) In addition, a number of methodologically sound studies of combined oral contraceptives suggest that, in humans, progestins protect against endometrial and ovarian cancer and have no effect on breast cancer risk. In fact, progestins, including DMPA, are used to treat endometrial cancer. After examining the cancer issue, the WHO Toxicology Review Panel and the International Medical Advisory Panel of the International Planned Parenthood Federation, as well as a number of other medical bodies, have endorsed the use of DMPA.

The controversy over DMPA and the conflicting findings in animal and human studies raise several basic questions about all drug safety research:

- Which animals are relevant models for studying a drug used by humans?
- How large and how long should human studies be before contraceptives or other drugs that do not show adverse effects in humans are approved for use by informed individuals who wish to use them?
- What type of postmarketing surveillance, if any, should be undertaken to look for rare or long-term effects that would be difficult to identify except after widespread use?

Progestin-Releasing IUDs

Natural and synthetic progestins were first added to IUDs in the early 1970s. The T-shaped Progestasert IUD releases about 65 μg of progesterone daily and remains effective for about a year. Its main advantages over nonhormonal IUDs are less menstrual bleeding per cycle and less painful menstruation. The major disadvantages of the Progestasert are higher cost, the need for replacement each year, intermenstrual spotting, and possibly more ectopic pregnancies than with other IUDs. The Population Council is developing a levonorgestrel IUD that releases about 20 to 30 μg daily. This IUD also reduces menstrual bleeding and pain. WHO is developing a low-dose levonorgestrel IUD that releases about 2 μg daily. These devices may be effective for as long as seven years.

Implants

Implants consist of polydimethylsiloxane (Silastic) or other polymer-based rods or capsules that are inserted under the skin and slowly release a progestin. Depending mainly on the amount and type of progestin, implants can prevent pregnancy for as long as seven years. The Population Council has developed two versions of an implant, formally called the NORPLANT System, that release 30 to 68 μg of levonorgestrel daily. Even after three years, less than one percent of users have become pregnant. The method is reversible by removing the implant. In clinical tests only about 20 percent of women discontinued use during the first year, many citing menstrual irregularities. Although in some users implants may be slightly visible when placed in the arm, this fact has not deterred most users so far. Norplant is not yet available to the public.

Vaginal Rings

Silastic rings also have been designed that can release hormones gradually into the vagina. Two types are being developed:

- Ovulation-inhibiting rings, which release about 250 to 290 μg of levonorgestrel daily together with small amounts of estrogen. The recommended schedule of use is three weeks in place followed by removal for one week. Each ring may be used for six months.
- Low-dose rings, which release between 20 and 50 μg of progestin daily but do not prevent ovulation in most cycles. WHO has pioneered this approach with the Varlevo-20 ring, which makes cervical mucus impenetrable to sperm. These rings can be kept in place for several months without interruption. Effectiveness data are not yet available.

Both rings are still under development and are not yet available for general use. Rings are sometimes expelled, although they can be easily replaced. In preliminary trials some women or their partners found them uncomfortable during coitus.

Current Issues

Costs and availability of long-acting progestins vary greatly. DMPA and NET EN are now sold in bulk to donor agencies and family planning organizations for between $0.50 and $1.00 (US) per dose. Progestin-releasing implants and levonorgestrel IUDs will probably cost about $10.00 apiece for the device. Any fee for injection or insertion is extra.

Other research is focusing on biodegradable implants, new injectables, a once-a-month pill consisting of both estrogen and progestin, and hormonal methods for men. These long-acting methods are still under development, and the extent of testing in humans is limited. Costs and availability cannot be predicted.

New contraceptive methods can offer a wider choice to individuals and couples. The challenge to researchers and policy-makers is to find out, as rapidly as possible, what the relative risks and benefits are for a wide range of potential users. The challenge to family planning programs is to make sure that all methods which are reasonably safe and effective are readily available with full information on advantages and disadvantages. **End of Editors' Summary.**

BACKGROUND

One goal of contraceptive research is to develop an effective, long-acting method that does not require action on a daily basis or at each act of coitus, yet is easily reversible. Voluntary sterilization provides long-term protection against pregnancy but is not generally reversible. IUDs provide long-term protection and reversibility but are not suitable for all women. Female hormones offer another possibility for long-acting, reversible protection against pregnancy, but the search for a long-acting hormonal method free from any suspicion of serious side-effects has proved a difficult one.

The first hormonal contraceptives, developed in the mid-1950s, were short-acting progestins administered orally. Although these progestins effectively prevented pregnancy by suppressing ovulation, they caused irregular menstrual bleeding. It was soon discovered that estrogen, present in the progestin as an impurity of the manufacturing process, could reduce menstrual disruption. Therefore estrogen was deliberately added to the progestin. The result was the combined estrogen-progestin pill, the first marketed hormonal contraceptive. Later, in the late 1960s, low-dose, daily progestin-only pills—the minipills—were introduced (420).

Even before the combined pill was first marketed in 1960, however, progestins had been synthesized that were long-acting when injected. Then contraceptive researchers began using plastics, rubber, and polymer technology to develop drug-carrying devices that can release progestins gradually in the uterus, the vagina, or even under the skin. In these ways a number of long-acting hormonal contraceptive methods became possible—injectables, medicated IUDs, vaginal rings, and implants.

Since the 1950s all of these long-acting methods have been tested. Only one—the injectable Depo-Provera—is widely used, in both developed and developing countries. Other long-acting methods—various injectables and progestin-releasing IUDs—are less widely used, while implants and vaginal rings are still under development.

History of Injectables

The first injectable progestins were developed in 1953 by Karl Junkmann (121, 243). In 1957 Junkmann and his associates at Schering AG in Berlin synthesized long-acting injectable esters of the progestin norethindrone (also known as norethisterone), including norethindrone enanthate (NET EN) (244). At about the same time the Upjohn Company in the US developed medroxyprogesterone acetate (MPA or, in its depot, or injectable form, DMPA) and gave it the trade name Depo-Provera (29).

NET EN was the first injectable progestin used as a contraceptive. It is sold chiefly by Schering AG under the trade name Noristerat. In 1965 Schering AG began field trials. NET EN was first marketed in 1967 in Peru. Although licensed and marketed in over 40 countries (454), NET EN has not been as widely used as DMPA. Use may soon increase because the International Planned Parenthood Federation (IPPF) began supplying NET EN to family planning programs on request in 1983 (76). In the US toxicological tests of NET EN in laboratory animals are underway. The US Food and Drug Administration (US FDA) has approved the start of clinical trials in women (141).

The first clinical trials of DMPA as a contraceptive began in 1963, followed by field trials starting in 1965. In 1967 the Upjohn Company applied to US FDA for permission to market DMPA as a contraceptive in the US. By that time it was clear that the estrogen in oral contraceptives (OCs) was responsible for unpleasant side-effects such as nausea and vomiting. Suspicions, later confirmed, were growing that estrogen was associated with blood clots (thromboembolic disease) in pill users. Thus estrogen-free hormonal methods such as Depo-Provera and the minipill looked attractive. By 1970, however, studies showed that some progestins, including DMPA, caused breast nodules in beagles (54, 150). While a number of scientists concluded that these findings were not relevant to humans (82, 210, 367) (see p. K-32), the results induced caution in the US FDA. Also, in the US and UK in the early 1970s evidence of a link between blood clots and oral contraceptives heightened public concerns about the safety of all hormonal contraceptives, even though the estrogen, not the progestin, was under suspicion.

In September 1974 the US FDA announced its intent to approve DMPA for contraceptive use but only for women who were not

In the McCormick Hospital family planning clinic, Thailand, women line up for DMPA. Injectables have been used in Thailand since 1965. (Courtesy of E.B. McDaniel) able to use other methods or had had contraceptive failures with other methods and who accepted the "small possibility of permanent infertility" (456). This action followed a 1973 recommendation of the US FDA Obstetrics and Gynecology Advisory Committee (642). Shortly afterward, the agency suspended its intended approval when a US Congressman questioned whether DMPA use might increase the risk of cervical cancer (1, 149, 455). One year later, in 1975, a subcommittee of members of the FDA Obstetrics and Gynecology Advisory Committee and the FDA Biometric and Epidemiologic Methodology Advisory Committee concluded that there was no evidence of increased risk of cervical cancer, and the Obstetrics and Gynecology Advisory Committee once more recommended approval of DMPA, again for a limited group of women (524, 642).

Nevertheless, three years later, in 1978, the US FDA formally denied approval of DMPA for contraceptive use, citing four major grounds:

- Questions raised by the development of breast nodules in beagles given DMPA were not resolved.
- There was a potential risk of birth defects in cases of contraceptive failure.
- Estrogens would be used to control irregular menstrual bleeding caused by DMPA, reducing the benefits of progestin-only contraception.
- A significant need for DMPA in the US had not been demonstrated (1, 108).

Continuing Controversy

The US FDA decision in 1978 did not end the controversy, however. Later that year uterine cancer, apparently of endometrial origin, was discovered in 2 of 12 autopsied monkeys given 50 times the equivalent of the human contraceptive dose of DMPA in toxicology tests (527). As of 1983 no evidence of higher risks of any cancer in humans using DMPA has been identified. (See p. K-33.) The supporters of DMPA—primarily family planning advocates and program administrators, scientists, doctors, and the Upjohn Company, manufacturer of Depo-Provera—point out that neither epidemiological research nor two decades of human use has shown any serious side-effects of DMPA. They argue that the known benefits of DMPA outweigh any potential future risks. Since 1979 several national and international scientific groups have endorsed the use of DMPA: the Toxicology Review Panel of the World Health Organization (WHO) Special Programme of Research, Development and Research Training in Human Reproduction (569, 577), the International Medical Advisory Panel of the International Planned Parenthood Federation (IPPF) (227, 228), the Special Advisory Committee on Reproductive Physiology of the Canadian Health Protection Branch, Department of National Health and Welfare (609), the American College of Obstetrics and Gynecology (21), the Committee on Drugs of the American Academy of Pediatrics (20), and the Ad Hoc Consultative Panel on Depot Medroxyprogesterone Acetate, convened on behalf of the US Agency for International Development (US AID) (4). The Ad Hoc Panel, with the exception of one member, recommended that US AID supply DMPA to nations that request it (4). US AID currently does not distribute DMPA because it is not approved for contraception by the US FDA.

Critics of DMPA disagree. Opponents are consumer groups, certain feminist organizations such as the National Women's Health Network in the US, some scientists, and political groups that oppose US funding of family planning programs in developing countries (181). They express a number of concerns. Some emphasize health risks, particularly cancer. They argue that both the known side-effects of DMPA in women, such as menstrual irregularities, and the questions raised by animal studies about cancer are sufficient reasons to limit use of the drug (94, 214, 286, 336). They point out that rare but serious side-effects of other drugs and devices for women were discovered only after widespread use. As evidence of ill effects, some opponents identify individuals who have developed various health problems during or after DMPA use and who attribute these problems to the drug (634).

The injectable form of administration also is under attack. Some fear that women will be given the drug without knowing what it is and without their informed consent (214, 414, 548). Opponents of DMPA also point out that, because the drug is a long-acting injection, its effects—including any major or minor side-effects—cannot be quickly stopped by discontinuing use.

The use of DMPA in the US is again under review. Under US FDA procedures, in January 1983 a Public Board of Inquiry conducted a hearing, at the request of the Upjohn Company, to reconsider the US FDA refusal to approve DMPA. The specially convened board, consisting of three scientists, was selected jointly by Upjohn and US FDA. The recommendations of the board will be reviewed by the Commissioner of the US FDA, who will make the final decision on Upjohn's appeal.

Regulatory agencies in countries besides the US recently have considered or are considering DMPA. In 1981 the Swedish National Board of Health and Welfare approved licensing of DMPA for contraceptive use (494). In West Germany, where currently both DMPA and NET EN have unconditional approval, the Federal Health Ministry is holding hearings to decide whether use should be restricted (613). In the United Kingdom the Committee for the Safety of Medicines (CSM) in 1982 recommended broader approval of DMPA (598), but, as in the US, the decision caused political controversy. The Ministry of Health overruled the CSM recommendati[illegible]8). An appeal was heard in April 1983 (596). Currently in the UK, DMPA is approved as a contraceptive only for women who have just had rubella vaccinations or whose husbands have just had vasectomies (227).

The ongoing debate about DMPA has raised larger issues about the testing and regulation of contraceptives and of drugs in general. Among the issues are:

- How much reliance should be placed on animal studies? Which animals should be used?

Depo-Provera

More than two million women currently use Depo-Provera (DMPA) for contraception. One injection of 150 mg of DMPA in one or 3 ml of fluid effectively prevents pregnancy for at least three months. (Courtesy of the Upjohn Company)

- How much evidence from human studies is necessary for a regulatory decision—particularly if animal studies suggest harmful effects?
- What is the role of postmarketing studies in humans? Who should conduct and who should pay for these studies?
- What uncertainty about potential risks is acceptable in view of the benefits of a drug?
- In addition to effectiveness and safety, what criteria should be the basis for regulatory decisions? Should the number of potential users be considered? How relevant is the potential for misuse or abuse of the drug?

Controversy also extends to the international arena. Among the international issues are:

- What role should the decisions of developed-country regulatory agencies, especially the US FDA, play in the policy decisions of developing-country regulatory agencies or family planning and health programs? Because of the 1978 US FDA decision and the surrounding publicity, several developing countries have delayed the introduction of DMPA into national family planning programs, or, in the case of Zimbabwe, temporarily stopped its use (134).
- Should donor agencies supply drugs or other products on request to developing countries if the product is not approved for use in the donor country?
- Should national donor agencies try to restrict international organizations in the methods of family planning that are supplied?

USAGE

About four million women are currently using some form of long-acting hormonal contraception, according to surveys and reports from manufacturers. Almost all use injectables, the only long-acting method that is widely available. About 200,000 women in the People's Republic of China are using a monthly pill (395). Between 100,000 and 150,000 women in the United States and Western Europe are using progestin-releasing IUDs (334). Other long-acting hormonal contraceptives—implants, vaginal rings, and biodegradable systems—are still in the development or testing stages.

Noristerat
Noristerat
Depot-Kontrazeptivum
SCHERING AG BERLIN/BERGKAMEN
200 mg
Schering
i.m.

Sales of the injectable Noristerat have grown rapidly in the last several years. A one ml injection containing 200 mg of NET EN is highly effective for contraception when given every two months. (Courtesy of Schering AG)

Injectable contraceptives are now legally permitted and therefore theoretically available in over 100 countries. By far the most widely-used injectable is Depo-Provera, the Upjohn Company trade name for DMPA. Each year between 1978 and 1981 the Upjohn Company sold about 7 million doses of Depo-Provera—enough to supply 1.75 million women—and in 1982 sales reached 8 million doses—enough for 2 million women (see Table 1). Sales are evenly divided between developed and developing countries (527). In addition, manufacturers in Italy and Eastern Europe produce and sell DMPA to companies in Thailand and elsewhere, who package it for contraceptive and other uses (49, 133, 394). These manufacturers now provide DMPA for about 300,000 Thai women—three-quarters of all DMPA users in Thailand (53, 429). Schering AG reports that about 1.4 million doses of NET EN were sold in 1982—enough for about 275,000 women for a year (453). Monthly injectable preparations containing both progestin and estrogen are used by at least another 1.1 million women, mostly in China and Latin America (199, 307, 395). Data from recent representative sample surveys (see Table 2) and from manufacturers and other estimates indicate that injectables are most widely used in Jamaica, Thailand, New Zealand, Mexico, Sri Lanka, China, and Trinidad and Tobago. In other countries, where supplies are often not available, usage is relatively slight—usually 2 percent or less of married women of reproductive age (MWRA).

Jamaica has the highest reported percentage of women using injectables. Eleven percent of MWRA, or 21 percent of all contraceptors, are using Depo-Provera. Use of injectables nearly doubled between the 1975–76 World Fertility Survey and the 1979 Contraceptive Prevalence Survey, from 6 percent of MWRA to 11 percent (84, 351). During the same period, injectables moved from the fourth most popular contraceptive—after oral contraceptives, female sterilization, and condoms—to the second most popular, after oral contraceptives. A recent study of the records of family planning clinics, which are the primary source of injectables, found that in 1971 Depo-Provera was the choice of 11 percent of new acceptors, while in 1976 it was the choice of 34 percent (34). Depo-Provera is supplied to family planning programs in Jamaica primarily by the United Nations Fund for Population Activities (UNFPA), with a small amount provided by the International Planned Parenthood Federation (IPPF).

Table 1. Total Public- and Private-Sector Sales of Depo-Provera 150 and Noristerat, 1975–1982 (in thousands of doses)

Year	Depo-Provera	Noristerat
1975	4,386	2
1976	4,079	28
1977	4,766	78
1978	7,041	545
1979	6,880	796
1980	7,028	557
1981	6,788	1,035
1982	8,000*	1,418

Note: Data represent only sales of contraceptive doses.

*Estimated

Source: Schering AG (453, 454), Upjohn International Inc. (133)

DMPA has been used in **Thailand** for almost 20 years, and, according to the 1981 Contraceptive Prevalence Survey, 7 percent of MWRA are now using injectables (245). Injectables are the third most popular method of contraception, after female sterilization and oral contraceptives. They are most popular among younger women. Among contracepting women age 15–25, about 20 percent use injectables, compared with less than 10 percent among contracepting women age 40–49, according to the survey. In 1972, 6,000 of 457,000 new acceptors in family planning programs—or one percent—chose injectables, according to government statistics. By 1981, 170,000 of 1,125,000—or 15 percent—chose injectables (429). Although NET EN and monthly preparations are available, DMPA is by far the most widely used injectable. Nine different companies package and sell DMPA in Thailand (53).

In **New Zealand** Depo-Provera has been commercially available since 1968 (401). Sales increased steadily until the mid-1970s and then leveled off at about 80,000 doses a year (enough for 20,000 women) between 1977 and 1981 (226). This represents about 4 percent of MWRA (542), which may be the highest level of use in any developed country.

In **Mexico** the 1978 Contraceptive Prevalence Survey found that 3 percent of MWRA were using injectables. This amounts to almost 300,000 women (542), or about 7 percent of all users worldwide. The products available include Depo-Provera; NET EN, marketed both by Schering AG as Noristerat and by Syntex Internacional S.A. as Syngestal; and two monthly preparations, 150 mg dihydroxyprogesterone acetophenide (DHPA) with 10 mg estradiol enanthate and 75 mg DHPA with 5 mg estradiol enanthate, marketed by at least eight different manufacturers (199). Most users obtain injectables from pharmacies. Injections are often given by "injectionists"—practitioners with little or no formal training who specialize in giving injections (199). Between July 1981 and June 1982, commercial sales of Depo-Provera were sufficient for 21,000 women; sales of Noristerat, for 16,000 women; sales of Syngestal, for 7,000 women; and sales of all monthly injectables, for over 200,000 women (199). In addition, both UNFPA and IPPF supply Depo-Provera to family planning programs in Mexico (76, 521).

In **Sri Lanka** use of Depo-Provera has recently grown to a substantial level. Depo-Provera was introduced in 1968 on a limited basis by the Family Planning Association of Sri Lanka (FPASL) (42). For many years usage remained slight. According to the 1975 World Fertility Survey, less than 0.5 percent of MWRA were using injectables (see Table 2). In the mid-1970s, FPASL made DMPA, obtained from IPPF and UNPFA, available

Table 2. Percentage of Married Women of Reproductive Age Using Injectable Contraceptives, as Reported in Representative Sample Surveys, 1971–1981

Region & Country or Area	Ref. No.	Year	% Using: Any Method	% Using: Injectables	% of Contraceptors Using Injectables[a]
AFRICA & MIDDLE EAST					
Kenya	257	1977–78	9	1	8
Lesotho	285	1977	7	<0.5	4
Mauritius	208	1975	46[b]	2	4
Sudan (North)	289	1978	5	<0.5	3
Syria	289	1978	23	<0.5	2
Turkey	201	1978	50	<0.5	1
ASIA & PACIFIC					
Bangladesh	37	1979	13	<0.5	2
	37	1981	19	<0.5	2
Fiji	84	1977	41	<0.5	1
Hong Kong	215	1977	71	2	3
Indonesia	84	1976	26	<0.5	1
Korea, Rep. of	84	1974	35	<0.5	1
Malaysia	84	1974	33	<0.5	1
Philippines	84	1978	36	<0.5	1
Sri Lanka	84	1975	32	<0.5	1
Thailand	84	1975	32	2	6
	351	1978	53	5	9
	245	1981	59	7	12
EUROPE					
Belgium	91	1971	88	1	1
(Flemish only)	92	1975–76	87	1	1
LATIN AMERICA & CARIBBEAN					
Colombia	84	1976	43	<0.5	1
	351	1978	48	1	3
	118	1980	51	2	3
Costa Rica	84	1976	64	2	3
	351	1978	48	1	3
	118	1980	66	2	3
Dominican Republic	84	1975	32	<0.5	1
El Salvador	351	1978	34	<0.5	1
Guatemala	351	1978	18	1	6
Jamaica	84	1975–76	39	6	16
	351	1979	55	11	21
Mexico	84	1976–77	30	2	6
	351	1978	41	3	8
Panama	84	1976	54	1	1
	351	1979–80	61	1	1
Paraguay	351	1977	24	1	3
	385	1979	47	2	5
Peru	84	1977–78	31	1	3
Trinidad & Tobago	515	1977	61	5	8

Note: Level of use was found to be zero by Contraceptive Prevalence Surveys in Tunisia, 1979 (351); Rep. of Korea, 1979 (351); and 8 states in Brazil, 1978–81 (350, 351, 628); and by World Fertility Surveys in Senegal, 1978 (289); Pakistan, 1975 (84); Guyana, 1975 (84); and Venezuela, 1977 (532).

Data from Contraceptive Prevalence Surveys (118, 245, 351) except Bangladesh (37) exclude douche, abstinence, and "other" from total contraceptive users; data from World Fertility Surveys (84, 201, 215, 257, 285, 289, 385, 515) and Bangladesh Contraceptive Prevalence Survey (37) include these methods; data from Mauritius survey (208) include abstinence and abortion; data from Belgian surveys (91, 92) include douche.

Women surveyed are currently in union (Latin America & Caribbean) or married (elsewhere), age 15–44 or 15–49. Exceptions are: Lesotho, Sudan, Syria, Turkey, Haiti, and Trinidad and Tobago, where women surveyed were currently in union or married, age 15–44 or 15–49, fecund and nonpregnant (including users of voluntary sterilization); Mauritius, where ever-married women less than 50 years old were surveyed; Belgium, where married women age 30–34 were surveyed in 1971 and age 16–44 were surveyed in 1975–1976; and Costa Rica, where women surveyed in 1976 were in union, age 20–44.

[a] Figures are not derivable from preceding columns due to rounding.

[b] Excludes sterilization. All other surveys include users of voluntary sterilization.

through all clinics. By 1977 the number of acceptors was increasing rapidly (638). As of 1981 over 70 percent of new acceptors of reversible methods at FPASL clinics chose Depo-Provera (42). Overall prevalence cannot be determined until another nationwide survey is undertaken. (Similarly, in Indonesia, while an estimated 4 percent of all contraceptors use injectables, latest national program figures show about 20 percent of new clients choosing injectables (522).)

In the **People's Republic of China**, production figures for 1979–80 suggest that about 800,000 women, or one percent of all those contracepting, are using a monthly injectable. The injectable, manufactured by the Chinese government, consists of 250 mg of the progestin 17-Hydroxyprogesterone caproate and 5 mg of the estrogen estradiol valerate. In 1984 a new manufacturing facility for injectables, built with the assistance of UNFPA, will begin operating, producing enough for another 2.5 million women annually (394, 395). Monthly pills containing various hormones also are used in China. Production is sufficient for over 200,000 women a year (395). The one million Chinese women estimated to be using the monthly injection or the monthly pill account for about one-fourth of all women using long-acting hormonal contraceptives worldwide.

Why are injectables frequently used in these six countries and not elsewhere? Availability of supplies and medical support for the method in national and private sector family planning programs are probably the most important reasons, since studies show that a high proportion of women will use the method if given a choice (see p. K-36).

Donor Agency Supplies

Although US AID does not supply any injectables, other donor agencies do. IPPF and UNFPA are the major donors (see Table 3).

The quantity of injectables provided by donor agencies peaked in 1979 at 2.7 million doses (see Table 3). Since then it has declined, partly because programs in Thailand have been purchasing some or all of their DMPA independently. Thailand had been the largest recipient of donor-agency supplies, receiving over one-half of all such supplies between 1978 and 1981. The transition from donations to purchases was assisted by a World Bank loan for purchases in 1980 and 1981 (412).

IPPF, currently the largest supplier of injectables, has for over 10 years been supplying Depo-Provera to member family planning associations in developing countries that have requested it. Since 1975 IPPF has supplied almost 4 million doses. In 1983 IPPF also began to supply Noristerat (76). UNFPA has supplied an estimated 2.7 million doses of injectables, mostly Depo-Provera, since 1974. More than 60 percent of these supplies were sent to four countries—Bangladesh, Jamaica, Pakistan, and Thailand (641). PAHO has supplied Depo-Provera and/or Noristerat to eight Central American and Caribbean countries between 1979 and 1981. Most shipments have been small, with the exception of the delivery of 100,000 doses of Noristerat to Mexico in 1979 (483). World Neighbors, a small, nongovernmental organization, has supplied about 50,000 doses of injectables, mostly Depo-Provera, since 1976. Most of these shipments have been to Indonesia and the Philippines (117).

Other donor agencies have followed varying policies concerning supply of injectables. US AID does not supply injectables because they are not approved for US use by US FDA. The only long-acting hormonal method so far approved by US FDA is the Progestasert IUD. The World Bank, through a loan, and the Canadian International Development Agency (CIDA) provided DMPA to Thailand in the past but generally do not supply contraceptives of any kind (377, 412). The Overseas Development Administration (ODA) of the United Kingdom has not recently supplied any Depo-Provera but is generally willing to do so as

Table 3. Deliveries of Injectable Contraceptives[a] by Donor Agencies, by Region and Year, 1975–1982 (in thousands of doses)

Region & Donor	1975–78	1979	1980	1981	1982	Total 1975–82
AFRICA						
IPPF	280.0	165.5	122.1	197.9	260.5[b]	1,026.0
SIDA	112.0	60.0	—	—	—	172.0
UK ODA	1.0	—	—	—	—	1.0
UNFPA[c]	9.0	108.7	11.0	14.4	1.5[b]	144.7
World Neighbors	—	—	—	—	2.0	2.0
Subtotal	402.0	334.2	133.1	212.3	264.0[b]	1,345.7
ASIA & PACIFIC						
CIDA	600.0	1,000.0	400.0	—	—	2,000.0
IPPF	1,261.9	334.7	263.7	110.8	150.8[b]	2,121.9
SIDA	89.0	3.5	150.0	—	—	242.5
UK ODA	64.5	—	—	—	—	64.5
UNFPA[c]	580.6	394.2	195.0	292.5	164.7[b]	1,627.0
World Bank (loan)[d]	—	—	400.0	1,180.0	—	1,580.0
World Neighbors	3.5	25.0	21.0	—	—	49.5
Subtotal	2,599.5	1,757.4	1,429.7	1,583.3	315.3[b]	7,685.4
EUROPE						
UNFPA[c]	—	29.1	3.1	3.3	—	35.5
LATIN AMERICA & CARIBBEAN						
IPPF	346.0	32.7	38.7	28.3	52.9[b]	498.6
PAHO	—	108.4	4.3	4.8	NA	117.5
UNFPA[c]	76.4	398.6	13.9	83.0	1.9[b]	573.8
World Neighbors	—	—	—	—	2.0	2.0
Subtotal	422.4	539.7	56.9	116.1	56.8[b]	1,191.8
MIDDLE EAST & NORTH AFRICA						
IPPF	68.5	12.0	15.0	18.0	14.8[b]	128.3
AGENCY TOTALS						
CIDA	600.0	1,000.0	400.0	—	—	2,000.0
IPPF	1,956.4	544.9	439.5	355.0	479.0[b]	3,774.8
PAHO	—	108.4	4.3	4.8	NA	117.5
SIDA	201.0	63.5	150.0	—	—	414.5
UK ODA	65.5	—	—	—	—	65.5
UNFPA[c]	666.0	930.7	223.0	393.2	168.1[b]	2,381.0
World Bank (loan)[d]	—	—	400.0	1,180.0	—	1,580.0
World Neighbors	3.5	25.0	21.0	—	4.0	53.5
TOTAL	3,492.4	2,672.5	1,637.8	1,933.0	651.1[b]	10,386.7

NA = not available

[a] Depot medroxyprogesterone acetate, except approximately 10% norethindrone enantinate (NET EN) in 1981–82 UNFPA deliveries (30) and 5% NET EN in 1980 World Neighbors deliveries (117).

[b] Estimated

[c] Estimated from expenditure figures at $1.00 (US) per dose (521).

[d] Figures represent doses purchased with World Bank loan.

Sources: Canadian International Development Agency (CIDA) (377)
International Planned Parenthood Federation (IPPF) (76)
Pan American Health Organization (PAHO) (483)
Swedish International Development Authority (SIDA) (140)
UK Overseas Development Administration (UK ODA) (254)
United Nations Fund for Population Activities (641)
World Bank (412)
World Neighbors (117)

part of ODA population projects (254, 255). The Swedish International Development Authority (SIDA) stopped providing DMPA in 1980. In 1982, in the midst of considerable public controversy, SIDA adopted a formal policy against supplying DMPA, even though in 1981 the Swedish Board of Health and Welfare had approved it for contraception in Sweden (494). A SIDA official has said that the reason for the decision "was not medical but the fact that it would be difficult and expensive to control its proper use in rural areas in developing countries" (491).

Overall, the quantities of contraceptives supplied by donors fluctuate from year to year because large shipments are often intended to last for several years. Nevertheless, supplies of injectables from most international donors except IPPF have declined since 1979. Apart from the case of Thailand, these declines may in part reflect government sensitivity to increasing political concerns, whereas IPPF supplies usually reflect requests from family planning associations to meet clinic needs and user preferences.

PHARMACOLOGY OF INJECTABLES

Both DMPA and NET EN have a long duration of action after a single injection. Compared with DMPA, NET EN is metabolized more quickly, and fertility returns sooner. With both drugs, however, the rate of metabolism varies widely among women.

DMPA is the depot injectable form of the progestin medroxyprogesterone acetate (17α-acetoxy-6α-methyl-pregn-4-ene-3,20-dione), a progestin derived from the natural hormone progesterone. DMPA is prepared in a microcrystalline suspension that delays absorption of the hormone after an injection. Within one week after a 150 mg injection, levels of medroxyprogesterone acetate (MPA) reach a peak, ranging from 1.0 to 6.8 ng per ml of serum (155, 156, 157, 237, 556). Serum levels remain elevated for two to three months and then decline steadily (384). (See Figure 1, p. K-26.) MPA may be undetectable in serum as early as 55 days after an injection but usually can be detected for about six months or even longer (156, 157, 263, 384). Women may ovulate as soon as 73 days after an injection. Usually, however, ovulation does not resume for four months or more (156, 157, 263, 384, 520). Serum levels of MPA do not accumulate with long-term use of the injectable at contraceptive doses. According to one study the average levels of MPA 90 days after an injection were very similar in women who had had eight injections and in women who had had only one (269).

Norethindrone enanthate (17-Hydroxy-19-nor-17α-pregn-4-en-20-yn-3-one enanthate), a progestin derived from testosterone, is prepared in an oily solution. Unlike the microcrystalline suspension used for DMPA, oily solutions do not have a fixed particle size. As a result, the rate of release from the injection site and into circulation may vary widely. Once injected, NET EN must be converted into norethindrone (NET) in the body before it is biologically active (152). Serum levels of NET reach a peak one week after injection and range from 4 to 26 ng/ml (180, 448, 552, 557). Serum levels decline steadily thereafter and generally are no longer detectable by 2½ to 4 months after an injection (152, 154, 157, 550, 552, 557).

EFFECTIVENESS

Both DMPA and NET EN are highly effective methods of contraception. With regimens of 150 mg of DMPA every three months or 200 mg of NET EN every two months, fewer than one woman in 100 is likely to conceive in one year. Thus currently available injectables are as effective as combined estrogen-progestin oral contraceptives taken regularly and more effective than IUDs.

Injectable progestins prevent pregnancy in several ways. They work primarily by:

- inhibiting ovulation in most women (154, 180, 184, 236, 337, 503, 550, 557).

They also may work by:

- making cervical mucus thick and scant, thus creating a barrier to sperm (304, 344, 411, 589),
- making the endometrium less suitable for implantation of a fertilized ovum (304, 305, 344), and
- possibly changing the rate of ovum transport through the oviducts (75, 305, 589).

DMPA has been given in several different dosage regimens, all of which consistently prevent conception. In most of the major studies, totaling more than 18,000 woman-years of use of the standard regimen—150 mg every three months—pregnancy rates are less than one per 100 woman-years (59, 65, 85, 89, 129, 284, 290, 326, 405, 460, 465, 570, 579, 590). Only one small study found a much higher rate (495). To put it differently, pregnancy almost never occurs during the 3-month period following an injection. Recent small studies suggest that lower doses of DMPA—100 or 75 mg every three months—are as effective as the 150 mg injection (156, 579). Studies of 6-month regimens with 250, 300, 400, or 450 mg of DMPA generally show slightly higher pregnancy rates, but with a range from 0 to 3.6 pregnancies per 100 woman-years (86, 249, 260, 299, 305, 316, 325, 378, 416, 459, 590). There have been no well controlled comparisons of 3- and 6-month regimens (164).

NET EN in 200 mg doses is more effective when injections are given at shorter intervals. Studies of injections at 12-week or 90-day intervals generally report failure rates of up to 5 pregnancies per 100 woman-years (89, 258, 304, 419, 570, 590), and some are even higher (495). Pregnancies generally occurred in the third month after the first or second injection (258, 570). With an interval of eight weeks between injections, however, life-table pregnancy rates range from 0 to 0.7 per 100 women at one year (177, 218, 579). NET EN also has been given as a 20 mg dose every month, with a one-year pregnancy rate of 0.2 among 200 women in India (407).

WHO has conducted two randomized multicenter trials comparing DMPA and NET EN (see Table 4). The first trial was stopped before completion because the pregnancy rate with NET EN administered at 12-week intervals was too high—3.6 per 100 women by 36 weeks. The pregnancy rate for the standard regimen of DMPA was 0.7 (570). A second trial was undertaken partly to study alternative NET EN regimens, each using 200 mg injections. In the first, NET EN was given every eight weeks. The 24-month pregnancy rate was 0.4. In the second, NET EN was given every eight weeks for six months and subsequently every 12 weeks; the 24-month pregnancy rate was 1.4. By contrast, the rate for DMPA was only 0.2 (574). WHO concluded that all three schedules were acceptable. The 8-week schedule of NET EN appears to be slightly more effective than the 8/12-week schedule, but it has the disadvantages of more frequent injections, greater cost, and higher drug load (580).

The effectiveness of injectables, particularly NET EN, may vary, perhaps depending on:

- timing of the injection relative to the menstrual cycle,
- rate of metabolism of the drug,
- the woman's weight,
- injection technique.

To ensure that a woman is not pregnant when she is injected, it is widely recommended that injectables be administered during the first five to seven days of a woman's menstrual cycle (227, 569). Also, injections given early in the cycle may be more effective in preventing later conception. Among 7,930 Thai women accepting DMPA, the pregnancy rate after one injection in the first eight days of the cycle was 1.6 per 100 women compared with 6.2 for those receiving an injection after the ninth day—a statistically significant difference (190). Some of these pregnancies may have been conceived before the women received their injections. A recent Thai study, however, suggests that DMPA given after the first week of the menstrual cycle may not always prevent ovulation in that cycle. Of 24 women injected on the ninth or eleventh day of their cycles, 5 ovulated later in the same cycle. Of 25 injected within the first week of their cycles, none ovulated (472).

Factors governing the rate of metabolism of contraceptive hormones are not well understood. Women in different population groups may metabolize an injectable progestin at substantially different rates (51, 157). For example, after an injection of 150 mg DMPA, Indian women ovulated within 2½ months, while Swedish women did not ovulate for at least five months (157). In another study, Indian and Thai women took twice as long on average as Brazilian women to resume ovulating after a 200 mg injection of NET EN (51).

Whether body weight influences hormone metabolism is unclear. In the first WHO comparative trial, NET EN users who became pregnant weighed significantly less on average than women who did not conceive. There was no difference among DMPA users (570). A small study in Thailand found that body

OTHER USES OF DMPA

In addition to use as a contraceptive, DMPA or its oral form, MPA, has been used to treat a wide variety of conditions (164). It is a recognized treatment for primary and metastatic endometrial cancer. In the US it is approved for palliative treatment of both endometrial and renal cancer (528). Breast cancer also has been treated with MPA, but effectiveness for this use is not certain. MPA also is used in the US, Europe, Australia, and elsewhere for endometriosis (162). In the US, MPA is sometimes used to treat precocious puberty, and it has been used alone and in combination with estrogens for postmenopausal hormone replacement therapy (67, 171, 352, 357, 492). In men DMPA combined with testosterone has been studied as a contraceptive, but whether it will ever be used for this purpose is uncertain (35, 392) (see p. K-44). DMPA in very high doses has been studied as a means of reducing testosterone levels in men whose sexual behavior is abnormal (169, 348).

Table 4. World Health Organization (WHO) Multicenter Comparative Studies of Depot Medroxyprogesterone Acetate (DMPA) and Norethindrone Enanthate (NET EN) Injectable Contraceptives

					Termination Rates per 100 Women[a] for:						
Author & Date (Ref. No.)	Months of Study	Drug	Dose	No. of Women	All Medical Causes	Pregnancy	Bleeding	Amenorrhea	Other Medical Causes	Non-medical Causes	Continuation Rate
WHO 1977 (570)	12[b]	DMPA	150 mg/ 12 wks.	846	23.4	0.7	9.3	11.5	3.1	7.7	71.2
		NET EN	150 mg/ 12 wks.	832	16.9	3.6[c]	10.3	1.8[c]	1.6[c]	9.5	75.6[c]
WHO 1982, 1983 (574, 580)	12	DMPA	150 mg/ 90 days	1,587	NA	0.1	15.0	11.9	8.7	20.7	48.6
		NET EN	200 mg/ 60 days	789	NA	0.4	13.6	6.8[c]	9.3	24.5	50.3
		NET EN	200 mg/ 60–84 days[d]	796	NA	0.6	13.7	8.4[c]	9.9	22.8	49.7
	24	DMPA	150 mg/ 90 days	1,587	NA	0.4	18.8	24.2	15.8	38.8	26.5
		NET EN	200 mg/ 60 days	789	NA	0.4	18.4	14.7[c]	16.0	42.6	29.3
		NET EN	200 mg/ 60–84 days[d]	796	NA	1.4	21.8	14.6[c]	16.7	40.2	27.6

NA = not available

[a] Gross life-table rates

[b] When the study was discontinued, about 20 percent of women using either injectable had completed one year of use. About 40 percent completed at least 9 months. Pregnancy rates for NET EN were the same at 9 and 12 months of use.

[c] Statistically significant difference relative to DMPA.

[d] Women in this group received NET EN 200 mg every 60 days for 6 months, then 200 mg every 84 days.

weight did not affect the metabolism of hormones or the return of ovulation (155).

Careful injection technique is essential with both DMPA and NET EN. If not all of the drug is drawn into the syringe from the container, the dose may be inadequate. The vials containing DMPA must be shaken thoroughly to prevent any sediment from remaining on the bottom of the container. NET EN is administered in a viscous oily solution that is difficult to take into and expel from a syringe. Warming the vial helps (152). If the drug is not injected deep into the muscle or if the injection site is massaged, release from the injection site may be accelerated, and the period of contraceptive efficacy shortened (579). Injections of DMPA are usually given in the arm; injections of NET EN, in the buttocks.

SIDE-EFFECTS

Menstrual disturbances are the most common and most troublesome side-effect of progestin-only injectables. Other frequently reported side-effects are weight gain and headache. Injectables appear to have less effect on the circulatory system than do OCs. Few metabolic changes have been reported with DMPA use—a slight increase in insulin levels and a decrease in high-density lipoproteins. The clinical importance of these changes is not clear, and no related clinical problems have been noted. For some women, DMPA may offer substantial benefits in addition to contraception. For example, a preliminary study suggests that DMPA has a beneficial effect on sickle-cell disease.

Menstrual Cycle Disturbances

Most women experience some menstrual cycle disruptions while using injectables. Normal menstrual patterns may be replaced by amenorrhea (absence of bleeding), irregular bleeding and spotting, or changes in the frequency, duration, and amount of blood loss. Generally, over two-thirds of women using DMPA and one-half of women using NET EN have no regular cycles in the first year of use (10, 85, 86, 261, 495, 571). Menstrual effects depend on the length of use. Intermenstrual bleeding and spotting decrease with time (10, 571), whereas amenorrhea increases. (See Figures 2 and 3.) In recent studies about 6 to 25 percent of women stopped using injectables in the first year because of changes in bleeding patterns (570, 580).

DMPA causes more bleeding and spotting and more amenorrhea than NET EN. Bleeding or spotting episodes lasting more than 10 days occur more often with DMPA (571). Nevertheless, in both WHO comparative trials discontinuation rates for irregular bleeding were very similar—about 9 to 15 for DMPA and about 10 to 13 for NET EN at one year (570, 571, 580). Amenorrhea lasting 90 days or more may occur in as many as 55 percent of DMPA users and 34 percent of NET EN users by the end of the first year of use (571, 527). In the first WHO trial, in which both injectables were given at 90-day intervals, the rate of discontinuation for amenorrhea was 11.5 with DMPA and 1.8 with NET EN. In the second WHO trial, in which NET EN was administered every 60 days, discontinuations for amenorrhea increased fourfold but were still less frequent than with DMPA (580) (see Table 2). While amenorrhea may cause some women concern, reduced blood loss might have the beneficial effect of reducing the chances of developing anemia.

Heavy bleeding, a potential health threat, is rare (193, 261, 266, 389, 527, 568, 576). In the first WHO multicenter trial, for example, only 6 of 1,214 women, or 0.5 percent, required treatment for either heavy or prolonged bleeding during 13,800 women-months of use (576).

With both NET EN and DMPA, changes in menstrual patterns are largely unpredictable. Amenorrhea appears to be more common in DMPA users with greater body weights, but not in NET EN users (300, 571, 580). NET EN users who experience intermenstrual bleeding and those who do not show no difference in hormonal profiles (579).

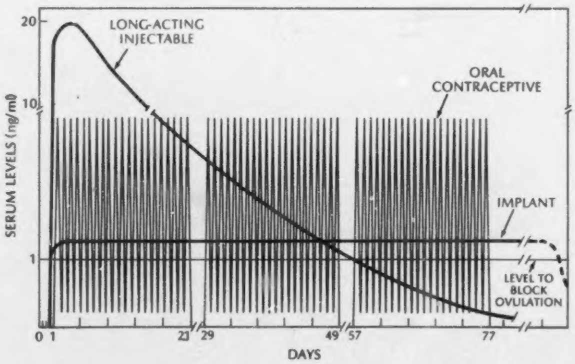
Management of Bleeding

Attempts to prevent bleeding irregularities caused by progestin-only injectables are generally unsatisfactory. While routine estrogen supplements were once widely used (59, 85, 129, 200, 221, 223, 233, 275, 304, 313, 325, 379, 405, 419, 465, 589), no controlled studies have shown that they reduce or stop menstrual disturbances (164, 266, 527, 569). In a recent randomized double-blind trial in Thailand, DMPA users taking the supplementary estrogen quinestrol and women taking a placebo did not differ in bleeding patterns or in rates of discontinuation for menstrual disorders (388). Other estrogens have not been tested.

Most clinicians do not now recommend routine use of any estrogen supplements with injectables (266, 569). Supplemental estrogens eliminate some of the advantages of injectables. Women must remember to take a pill. Also, estrogens can cause dizziness and nausea and may pose a risk of blood clots (266). Counseling before and during use may encourage continued use better than giving estrogens (221, 569).

While spotting or amenorrhea should not be routinely treated, very heavy or prolonged bleeding—which occurs infrequently—requires medical attention. A WHO publication recommends that a woman experiencing heavy and/or prolonged bleeding should first be examined for causes of the bleeding other than the injectable. It suggests 25 μg of estradiol, one tablet three times a day for three days, for moderate

Figure 1. Blood Serum Levels of Hormone in Users of Three Contraceptive Methods



Schematic representation of the levels of hormone in blood serum illustrates the differences among injectables, implants, and daily oral contraceptives. Just after an injection, the serum level rises quickly. Then it drops gradually as time passes. An implant releases hormone at a roughly constant rate, so serum levels remain constant. By contrast, oral preparations must be taken daily because the hormones are quickly metabolized. As a result, the serum level fluctuates each day. (Courtesy of Henry Gabelnick) and prolonged bleeding or for heavy bleeding in a user of DMPA or NET EN. If this is ineffective or if the woman's initial complaint is very heavy bleeding, an injection of 5 mg of estradiol cypionate in an oily suspension should be given. The dose should be repeated once if bleeding does not stop within 24 hours. If bleeding continues, dilation and curettage should be considered (569). The Upjohn Company recommends treating very heavy or prolonged bleeding with 0.05 to 1.0 mg of oral ethinyl estradiol for 7 to 21 days. If bleeding does not diminish in one or two cycles, the woman should switch to another method of contraception (527).

Weight Gain

Although up to one-quarter of women using injectables may lose weight, most women gain weight. The average weight gain is small, ranging in various studies from less than one kg to 5 kg in the first year of use (17, 86, 95, 218, 249, 353, 571, 580). Some women gain considerably more, however (39, 205, 249, 284). With DMPA every three months and NET EN every two months, weight gain is comparable (580). Some researchers find that weight gain with DMPA levels off after the first year of use (89, 205, 592). Others report a slow and continuing increase (39, 300, 440, 460).

The reasons for weight gain are not clear. The additional weight appears to be due to increased body fat, not to fluid retention. Researchers hypothesize that DMPA stimulates the hypothalamic appetite control center in the brain, causing women to eat more than they otherwise might (19). In undernourished women this effect would be beneficial if they can obtain more food.

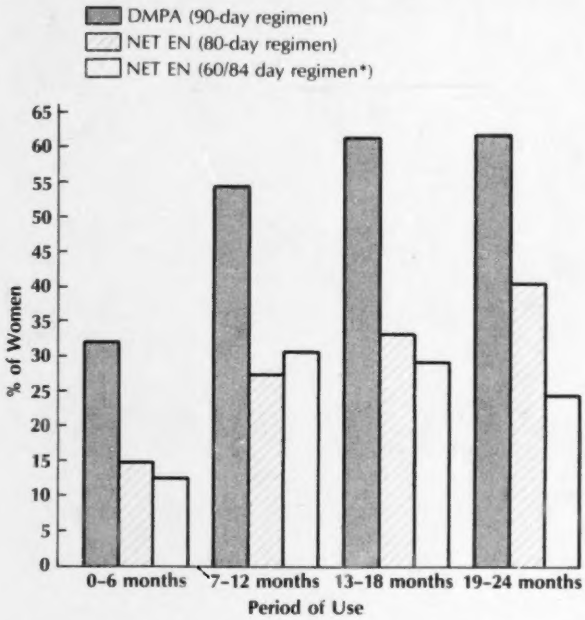
Cardiovascular Effects

Unlike combined estrogen-progestin contraceptives, progestin-only injectables appear to have little effect on either blood pressure or blood coagulation. Most studies show no significant change in systolic or diastolic blood pressure in women using either NET EN (10, 541) or DMPA (57, 119, 205, 353, 440, 460, 571, 592). Some studies show slight decreases in blood pressure with both drugs (57, 571, 580, 592). One early study found a significant increase in blood pressure in some DMPA users but a drop in blood pressure in about half the women who previously had hypertension (284). Another found a marked increase in diastolic pressure in 7 of 400 users (383).

There is no evidence that either DMPA or NET EN increases a woman's risk of blood clots or other circulatory system disease, although the extent and the intensity of follow-up may not be sufficient to rule out such effects (4). Most studies of DMPA use find no changes in coagulation and fibrinolytic systems (which may affect clotting) even at the high doses used for treating cancer (27, 62, 64, 219, 220, 333, 482, 559). Increased risk of blood clots associated with oral contraceptives is usually attributed to estrogen (487), which is absent from these injectables. Recent evidence suggests, however, that increased risk of heart attack and stroke in OC users may be associated with progestins (161, 252, 485, 488).

Changes in lipid metabolism, particularly reduction in levels of high-density lipoprotein (HDL) cholesterol, are suspected of increasing the risk of developing cardiovascular disease (185, 335). Such changes are sometimes seen in users of progestins, but their clinical importance is uncertain (158, 164, 273). On one hand, people with low levels of HDL cholesterol are more likely to develop atherosclerosis (185, 252, 335). On the other hand, there is no direct evidence that a drop in HDL

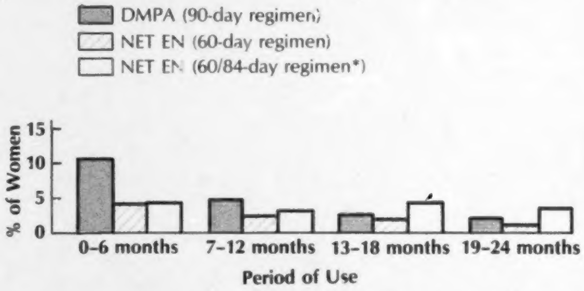
Figure 2. Percentage of Women Using DMPA or NET EN Who Experienced Amenorrhea for More Than 90 Days, by Period of Use



*Regimen consisted of 200 mg NET EN every 60 days for first 180 days and every 84 days thereafter.

Source: World Health Organization. Special Programme of Research, Development and Research Training in Human Reproduction. Multinational comparative clinical trial of long-acting injectable contraceptives: norethisterone enanthate given in two dosage regimens and depot-medroxyprogesterone acetate: final report. Contraception 27(4). April 1983. (In press)

Figure 3. Percentage of Women Using DMPA or NET EN Who Experienced Episodes of Bleeding and/or Spotting of 21 or More Days Duration, by Period of Use



*Regimen consisted of 200 mg NET EN every 60 days for first 180 days and every 84 days thereafter.

Source: World Health Organization. Special Programme of Research, Development and Research Training in Human Reproduction. Multinational comparative clinical trial of long-acting injectable contraceptives: norethisterone enanthate given in two dosage regimens and depot-medroxyprogesterone acetate: final report. Contraception 27(4). April 1983. (In press)

With both DMPA and NET EN, the percentage of women with amenorrhea generally increases with duration of use. Significantly more women become amenorrheic with DMPA than with NET EN (Figure 2). Bleeding and spotting tend to diminish over time. Differences among regimens are not marked except in the first six months, when significantly more spotting occurs in DMPA users (Figure 3).

In Thailand a health worker checks blood pressure before administering an injection of DMPA. Progestin-only injectables appear to have little or no effect on blood pressure. (Courtesy of E.B. McDaniel)

cholesterol levels accelerates the development of atherosclerosis (280). More research on this subject is needed.

The effect of injectables on HDL cholesterol is not clear, since only a few women have been studied and for short periods (280, 489). Several short-term studies of pre- and postmenopausal women taking large doses of MPA by mouth report no reduction in HDL cholesterol (212, 470, 507). By contrast, a recent study of 23 women who had taken contraceptive doses of DMPA for at least one year found that HDL cholesterol levels were 20 percent lower than in a control group of IUD users (273). The only study of NET EN users found that HDL cholesterol declined by about 25 percent after the first injection and did not decline further with up to four years of use (158). Concerning other lipids, most researchers have found no effect on triglycerides or total cholesterol (16, 122, 123, 158, 259, 561) or else a decrease in both, which could be beneficial (23, 196, 355, 497).

There are few reports of cardiovascular complications in women using injectables. Among 11,500 women using DMPA for over 200,000 woman-months, only 15 women, or 0.13 percent, developed either blood clots or some other form of thromboembolic disease (458). There has been one reported case of intercranial hypertension in a DMPA user (33) and one report of a fatal stroke in an Asian woman, a smoker, who had received two injections of DMPA (240). This situation contrasts with the history of circulatory system problems associated with oral contraceptives. Case reports of blood clots and stroke in OC users alerted researchers to the possibility of an association. The virtual absence of case reports involving injectables suggests that injectables do not increase the risk of circulatory system disease. At the same time, reports may be few partly because most long-term users are in developing countries where cases are less likely to be reported.

Metabolic Effects

Like other hormones, DMPA alters carbohydrate metabolism, but development of overt diabetes in women using DMPA for contraception has not been reported (569). Diabetes has been rare and no more common that expected among women receiving very large doses of MPA (the oral version of DMPA) for cancer therapy (530). Although many studies report no change in blood glucose or insulin levels in response to a glucose tolerance test (47, 123, 182, 305, 460, 497, 518, 520, 530), others find an increase (16, 79, 486, 533).

NET EN has been studied less extensively than DMPA. Of five studies (11, 23, 123, 176, 220), only one found an increase in insulin levels (23).

WHO does not consider diabetes to be a contraindication to use of injectables. Nevertheless, it suggests that women with the disease or a history of diabetes during pregnancy should have their glucose tolerance monitored if they use an injectable (569).

With a few exceptions (354, 446, 447), studies report that neither injectables nor large doses of MPA used to treat endometrial cancer affect liver function (18, 23, 137, 196, 259, 305, 355, 418, 460, 497). The Upjohn Company has received only 12 reports of jaundice or other liver disorders in the two decades that Depo-Provera has been on the market (527). Some researchers conclude that injectables can be used safely by women with a history of jaundice or liver disease (18, 137). Women with parasitic liver fluke infestation (*Opisthorchis viverrini*), a common condition in East and Southeast Asia, can use DMPA without harmful effects (196).

Injectables generally do not alter protein or vitamin metabolism (16, 18, 259, 460, 561). Blood serum levels of zinc may be lower in NET EN users than in nonusers. The clinical implications of this change are unknown (167, 408).

Other Side-Effects

The incidence of nonmenstrual side-effects other than weight gain in users of injectables varies widely. The complaints appear to be similar in type and frequency to those reported by women using oral contraceptives and IUDs (459, 460, 465). One of the most common is headache. The proportion of women with this complaint in different studies ranges from less than one percent (624) to 17 percent (460). In the first WHO trial significantly more DMPA users reported headaches than NET EN users, and the incidence of headache increased with longer use of MPA (571). In the second WHO trial, however, the proportion of women reporting headaches was similar (580). Other side-effects such as abdominal discomfort or distention are more common among women using DMPA than among NET EN users (571, 574).

Beneficial Effects

Like OCs, injectables may have beneficial effects in addition to preventing pregnancy. Injectables may increase hemoglobin concentration and so help prevent anemia (617). Also, several small studies in the 1960s and 1970s suggested that MPA and other hormones could prevent sickling, the development of abnormally shaped red blood cells in sickle-cell disease (9, 231, 232, 397). In a recent study of 23 Jamaican women with sickle-cell disease, women experienced significantly fewer episodes of bone pain when they used DMPA than during the control period when they used a placebo. Also, various blood measurements improved significantly. The researchers suggest that DMPA is the best contraceptive for women with sickle-cell disease (87). Sickle-cell disease, a genetic disorder, is found in the people of East, Central, and West Africa and in people whose ancestors came from that region. It is also found in the Mediterranean area, southern India, and the southern Arabian peninsula (622).

Injectables also may help prevent pelvic infection, a potentially serious condition. A recent WHO case-control study found that women using DMPA were less likely to develop pelvic inflammatory disease (PID) than women using no method (189). A similar protective effect has been seen with OCs (3, 437) (See **Population Reports**, *Oral Contraceptives in the 1980s*, A-6, May–June 1982). Also, DMPA and NET EN may reduce the incidence of vaginal colonization and infection with the microorganism *Candida albicans*, although evidence is very preliminary (468, 514).

EFFECTS ON REPRODUCTION

There is no evidence that injectables have any lasting effects on human reproduction after use is discontinued. Nevertheless, several considerations should be kept in mind:

- Return of fertility is usually delayed for several months after discontinuation.
- High doses of some progestins during pregnancy have occasionally had masculinizing effects on female fetuses.
- DMPA and NET EN may increase the volume of breast milk, although this is not certain because controlled studies are difficult to carry out. Both hormones are transmitted in minute quantities to breast-feeding infants; long-term effects are unknown, but to date no adverse effects have been observed.

Return of Fertility

Although a 150 mg injection of DMPA is not considered effective as a contraceptive for more than 90 days, in most women DMPA prevents pregnancy for a longer period. On average, former DMPA users require 1½ to 3 months longer to conceive than former users of OCs or IUDs. In a large study of Thai women who stopped contraception to become pregnant, the median time to conception after the last DMPA injection was 9 months—or 5.5 months from the time that the next injection would have been given—compared with 4.5 months for former IUD users and 3 months for former OC users (386, 387) (see Figure 4). The duration of infertility may depend on the rate of metabolism of DMPA and possibly also on body weight (40, 461).

No evidence suggests that injectables permanently impair fertility. More than 50 percent of women are menstruating by six months after discontinuation, and about 85 percent, by one year, suggesting that fertility has returned (42, 130, 172, 460, 465). Over 60 percent of women seeking to become pregnant do so within one year after discontinuation, and over 90 percent, within two years (40, 42, 130, 321, 387, 461). In the Thai study, by two years after discontinuation 92 percent of the DMPA users, 93 percent of the IUD users, and 95 percent of the OC users had become pregnant (see Figure 4). These differences are not statistically significant (386, 387).

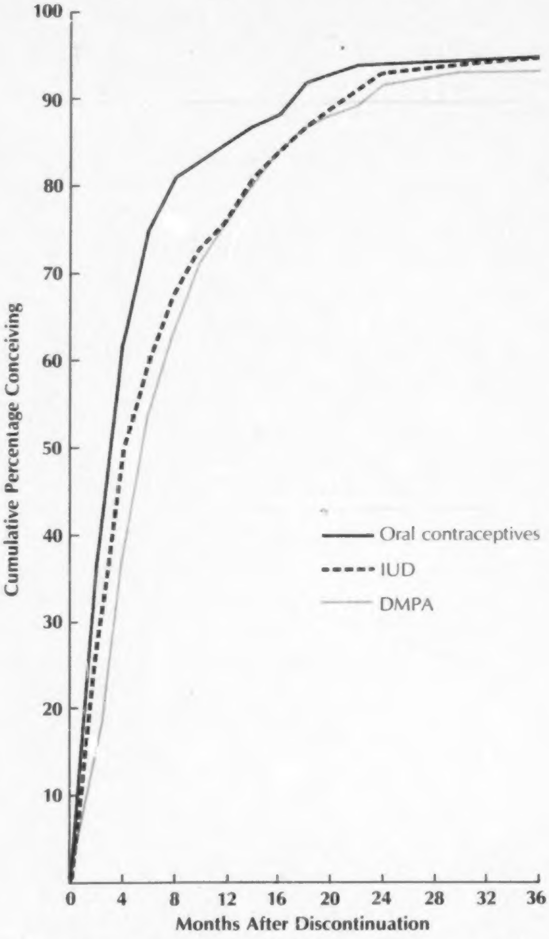
Other evidence also suggests that there is no permanent effect on fertility. Drugs to stimulate ovulation, such as chlomiphene citrate, have restored fertility in women with lengthy amenorrhea after DMPA injections (584, 588). Also, long-term users conceive as rapidly as women who have had only a few injections, suggesting that there is no cumulative effect (42, 130, 172, 321, 387, 461, 584).

With NET EN, the return of fertility after use of the standard 200 mg dose has not been studied extensively but may be quicker than with DMPA. NET EN is metabolized rapidly and by the fourth month after an injection cannot be detected in the blood (154, 157). Ovulation often occurs within three months after an injection, although it is sometimes delayed up to five months (51, 122, 154, 157, 180, 550, 552, 557). With NET EN, as with DMPA, the average time between discontinuation and ovulation seems to vary in different populations (51, 157).

Fetal Effects

Concern over potential teratogenic effects—that is, birth defects—was one reason given by the US FDA in 1978 for not approving DMPA as a contraceptive in the US. The concern arose not because of reports that injectable contraceptives caused birth defects, but because of suspicions about other progestins used in higher doses during pregnancy. It is ex-

Figure 4. Cumulative Conception Rates for Women Discontinuing Use of an IUD, Oral Contraceptives, or DMPA in Order to Become Pregnant



Sources: adapted from Pardthaisong (386) and from Pardthaisong et al. (387)

Women who discontinue DMPA to become pregnant take longer to conceive than former users of other methods, but their fertility is not permanently impaired. In this Thai study of over 1,300 women nearly 80 percent of former DMPA users and former IUD users conceived within 12 months after discontinuation. By 24 months almost 95 percent in all groups had become pregnant. This study considered 15 weeks after the last DMPA injection to be the date of discontinuation.

tremely difficult to study injectables directly because pregnancies among users are so few and in any case congenital anomalies occur in only a very small fraction of all births.

The chances of fetal exposure to NET EN and DMPA are slight. Pregnancies *during* use of an injectable are very few (see p. K-24). Pregnancies *after* use of an injectable rarely occur until hormone levels have dropped substantially. After an injection of DMPA, most women do not ovulate until circulating levels of MPA in the body are undetectable or very low—under 0.1 ng/ml (156, 263, 384, 556). With NET EN women usually do not ovulate until serum levels of NET are about 0.4 to 0.8 ng/ml, although ovulation has been reported at serum levels as high as 1.8 ng/ml (180, 552). Pregnancies *before* first injections are few when the injection is given in the first week of the menstrual cycle. In the Upjohn Company cooperative trials of DMPA, for example, 0.3 percent of the women had undiagnosed pregnancies at the time of the first injection (460). More pregnant women may receive injections, however, if women believe that injectables induce abortion and request them for that reason (417) or if injections are given after the first week of the menstrual cycle.

In the rare cases where pregnant women were exposed to DMPA, no increase in congenital malformations or prematurity has been observed (41, 129, 271, 311, 323, 389, 417, 460). Also, there has been no increase observed in congenital anomalies when women become pregnant after the contraceptive effect of DMPA has ended. In Thailand the incidence of all congenital anomalies in the infants of 1,133 former users of DMPA was 2.3 percent compared with 2.2 percent in infants of 4,029 women who had not used hormonal contraceptives. There also was no difference in the incidence of stillbirths or multiple births, in the sex ratio, or in the birthweights of children of former DMPA users compared with children of over 7,000 nonusers (311). Only two small studies, which had no control groups, have found a higher incidence of congenital malformations than in the general population (405, 590).

Interagency Group to Encourage Development of New Injectables

An interagency group has recently been formed to encourage and coordinate the selection and development of new, improved injectable contraceptives. The Inter-Agency Working Group on Injectable Contraceptives was set up in February 1983 by the Meeting of Agencies Conducting or Directly Supporting Research on Biomedical Aspects of Family Planning, an interagency gathering convened by WHO.

The goal of the new group is developing and testing new injectables, introducing them, and planning surveillance of widespread use. Agencies and countries interested in the task include WHO, the Program for Applied Research in Fertility Regulation (PARFR), the US National Institute of Child Health and Human Development (NICHD), US AID, Family Health International (FHI), the People's Republic of China, and the Indian Council of Medical Research. They hope to interest other agencies in their work and to cooperate with the pharmaceutical industry. The WHO Special Programme on Research, Development and Research Training in Human Reproduction will organize and chair meetings.

The new Working Group is holding its first meeting in June 1983. One goal of the first meeting is to draw up a short list of compounds or formulations that should be given priority for development.

In the 1950s and early 1960s large doses of various progestins were given to pregnant women to try to prevent threatened or habitual abortion. This treatment was never proved effective and is no longer recommended (567). Some progestins, particularly the progestins derived from testosterone, occasionally caused masculinization of the external genitalia (enlarged clitoris and/or labial fusion) in female children when the progestins were administered in the first trimester of pregnancy (452, 564, 565). There have been a few cases of such masculinization in female newborns whose mothers took oral doses of MPA (which is derived from progesterone rather than from testosterone) to prevent abortion (77, 452, 527). Some cases of enlarged clitorises reverse spontaneously in a short period (77).

Recent studies have suggested that prenatal exposure to hormones may cause other, nongenital anomalies (204, 209), but evidence is inconclusive since these studies were poorly controlled (188). Two prospective studies report a twofold greater risk of malformations for exposed children compared with unexposed children (204, 209). In these studies, however, some diagnoses of birth defects were inaccurate, and it is not clear that the hormones were administered during the critical period when fetal organs are developing (188, 607, 645). In most cases hormones were administered to prevent abortion or as pregnancy tests. Few cases involved contraceptives. Since serious malformations are a cause of threatened abortion, it is difficult to tell whether the malformation led to the use of hormones or the hormones caused the malformation (567). Most recent studies on oral contraceptives report no link between the pill and birth defects (565). (See **Population Reports**, *Oral Contraceptives in the 1980s*, A-6, May–June 1982.)

While the issue of teratogenicity may never be entirely resolved because of the difficulties of studying the question, there is no evidence clearly linking contraceptive progestins and any type of birth defects. As WHO has pointed out:

> . . . since pregnancies with long-acting injectables are uncommon, the disorders infrequent, and any potential teratogenic risk small, this is not likely to be a major public health problem. (568)

Potential risks can be minimized by administering injections only in the first five days of the menstrual cycle and by informing women that injectables do not cause abortion. In some programs, particularly where access to family planning services is limited, women are given injections at any time during the menstrual cycle (26, 316). When an early pregnancy is possible, women should be counseled that the potential for risks to the fetus is uncertain.

Lactation

Postpartum administration of DMPA either improves breastfeeding performance or has no measurable effects (see **Population Reports**, *Breast-Feeding, Fertility, and Family Planning*, J-24, November–December 1981). NET EN also appears to have no adverse effects on lactation (246, 406, 443), although research is more limited. This is in contrast to oral contraceptives containing both estrogen and progestin, which may reduce the volume of milk. Compared with nonusers, women using injectables sometimes produce more breast milk or breast-feed longer (32, 198, 239, 246, 267, 586, 587).

DMPA does not appear to change the composition of breast milk adversely. The concentration of protein and fat in the breast milk of DMPA users is either the same or higher than in nonusers'. Lactose concentration is unaffected (32, 222, 246, 267). The only study to date on immunologic effects found no significant differences in immunoglobulin concentration in the breast milk of women using DMPA or NET EN compared with nonusers (303).

Hormone Transmission in Breast Milk

When a breast-feeding woman uses any hormone, small quantities of the drug pass into breast milk and are consumed by the infant. Whether the infant will suffer any long-term ill effects is unknown and is now being studied.

The amount of hormone transmitted to the infant in breast milk is very small—less than 0.5 percent of the maternal dose (457, 567). It is highest shortly after an injection and declines rapidly thereafter (265, 268, 451). Probably only a portion of the hormone is absorbed in the infant's digestive system (569).

The infant's exposure to hormone is markedly less with NET EN than with DMPA. Suporn Koetsawang and colleagues report that one week after an injection the daily infant intake of hormones in 600 ml of breast milk ranges from 0.5 to 2.4 μg of NET and from one to 13 μg of MPA. By eight weeks only 2 of 10 women had detectable levels of NET in breast milk whereas 8 of 10 women had detectable levels of MPA (268). In another study NET was not detectable in the plasma of breast-fed newborns between two and five days after the mother's injection, even though plasma levels of NET in the mother were highest at that time (331).

Short-term effects of hormone exposure are minimal. Infant weight gain and development are not impaired (32, 119, 267) and in some cases are significantly greater than in unexposed infants (222, 246). Questions have been raised about possible immunosuppressive effects of DMPA on breast-fed infants, but in Thailand a small study found a similar rate of infectious diseases—about three per year—in infants of women using DMPA and in other infants (119).

Whether there are long-term effects of early exposure to hormones needs more study. In Chile preliminary results from a long-term study of children age three to six found no difference in psychomotor development and in the frequency of infections or other illness between children whose mothers had used DMPA while breast-feeding and children of women who had not used any hormonal contraceptives while breast-feeding. Children of DMPA users weighed less on the average than the other children, and a significantly greater percentage weighed less than the average expected amount for their age. The researcher attributed this difference to the longer period of breast-feeding—longer than optimum—among the infants of DMPA users (239).

Other studies of children report no discernible effects of exposure to injectables in breast milk—no difference in growth or in physical or mental development in children of users and nonusers followed for up to 10 years (527), and no detectable physical, mental, or bone abnormalities in about 200 18-month-old children whose mothers had used DMPA or NET EN (246). Sexual development has been delayed in rats exposed to high doses of DMPA in rats' breast milk (449). Studies following humans through puberty have not been conducted.

Neither WHO nor IPPF rules out the use of DMPA by lactating women (227, 568, 569). Since research on NET EN is limited, WHO suggests that DMPA or other methods are preferable during lactation (569). To minimize any potential effect on the infant when DMPA is used, the Upjohn Company recommends delaying the first postpartum injection for six weeks after delivery. At this time the infant's ability to metabolize and excrete the drug is better developed (527).

THE QUESTION OF CANCER

The question of whether long-acting progestin injectables—particularly DMPA—affect the risk of cancer is a major source of controversy. On one hand, certain laboratory animals exposed to DMPA and NET EN have developed more tumors in the uterus and the breast than have controls, and some of these tumors have been malignant. On the other hand, no evidence links progestin use with cancer in women. In fact, some progestins, including MPA, are used in high doses to retard the growth of cancer in reproductive organs, and combined estrogen-progestin oral contraceptives protect against endometrial and ovarian cancer. Two basic scientific issues remain unresolved:

- How relevant to women are the adverse findings from animal studies?
- How conclusive are the human studies, which have found no adverse effect but so far have been somewhat limited in size, duration of use, and extent of follow-up?

Investigating Cancer Risk

Information about the potential of a drug or other agent to cause cancer comes chiefly from toxicological tests in laboratory animals and from epidemiologic studies in humans. Animal studies are used for several reasons:

- They may reveal adverse effects without any risk to humans.
- Animals can be given doses far larger than the doses for humans. It is assumed that a drug which causes adverse effects, including cancer, will do so faster or more often when given in large doses (526). Thus adverse effects could be identified more quickly in animals than in humans. In fact, large doses of drugs may be given to animals with the intention of *causing* adverse effects. Researchers then have a better idea what to look for in humans.
- Animal studies can be more carefully controlled than human studies, so that other possible risk factors can be excluded.

The relevance of animal studies to humans is not always clear, however. Two chief issues are:

- Does the animal species respond to the drug similarly or differently from humans? If differently, does this indicate that the drug will affect the risk of cancer in humans differently? This is particularly a problem with reproductive hormones, which act very differently in different species.
- Do very large doses over long periods of time cause qualitatively different effects in animals than normal doses? If so, animal study results might not be relevant to humans using low doses.

Studies in humans can gauge risks directly. For a number of reasons, however, epidemiologic studies may not always produce conclusive results, especially when sex hormones and cancers of the reproductive organs are being studied:

- Many behavioral and genetic factors influence the risk of reproductive cancers. For example, age at first birth affects the risk of breast cancer (625). These factors need to be accounted for. This may require a large population and a complex experimental design.
- For many cancer-causing agents, years or even decades may elapse between exposure to the agent and detection of the cancer. Therefore studies may need to focus on people exposed to the drug many years ago.
- Risks might be undetectable after short-term exposure but substantial after long-term exposure. If there are few long-term users, studying their risks is difficult.
- With rare forms of cancer, it may take decades to gather enough cases for adequate epidemiological analysis.
- Even with more common cancers, such as breast cancer, large, long-term, prospective studies that could determine the incidence of cancer in those who have used hormonal contraceptives and those who have not are extremely difficult and expensive to conduct.

Animal Studies and Breast Tumors

The US FDA requires that hormonal contraceptives be tested in three animal species—rats, dogs (beagles), and monkeys. Rats must receive amounts of the drugs equivalent, on the basis of body weight, to one or two and 10 and 50 times the human dose for two years. Beagles must receive one or two and 10 and 25 times the human dose for seven years. Monkeys must receive one or two and 10 and 50 times the equivalent human dose for 10 years (54, 150, 604). With DMPA and NET EN, these animal studies have found higher rates of tumors in treated animals than in control animals in the following instances:

- in rats, breast tumors with NET EN but not with DMPA;
- in beagles, breast tumors with DMPA (information on NET EN in beagles is not yet available);
- in monkeys, endometrial cancer with DMPA and NET EN, and benign breast nodules with DMPA. (Information on NET EN and breast changes, if any, in monkeys is not yet available.)

Serious questions have been raised about the relevance to humans of these findings in animals.

While NET EN in high doses is associated with benign and malignant breast tumors in rats, it is generally agreed that this finding is not directly relevant to humans. NET EN has a strong estrogenic effect in rats, leading to an increase in prolactin secretion. This in turn stimulates growth of breast tissue and, it is theorized, the development of abnormal cells (368). By contrast, in humans both NET EN and DMPA have progestational effects and do not increase prolactin secretion. In addition, the chances that a progestin will cause breast tumors vary greatly from one rat strain to another. Because rats seem to be inappropriate models for testing progestins, the finding of breast tumors in rats has not prevented US FDA approval of testosterone-derived progestins for contraceptive use (602). (NET EN is derived from testosterone, while DMPA is derived from progesterone.)

In the two long-term studies with beagles, both control animals and animals receiving DMPA developed breast nodules, but a higher percentage of the dogs receiving DMPA had nodules. Some of the dogs receiving DMPA developed cancers (150, 160, 527, 531). Table 5 summarizes the results.

Dogs have been used in toxicity testing for many years, and their use is specified in US FDA requirements for testing of any new drug. Beagles were selected as the breed of dog to be used because they are easy to work with in the laboratory and are readily available (54). Dogs may not be suitable animals for testing progestins, however, because dogs respond to progestins and to the natural hormone progesterone very differently from women and most other species. The dog and the ferret are the only species in which progesterone or other progestins alone are known to cause marked growth of certain breast tissue (368). This abnormally rapid growth of normal cells in a normal arrangement, or hyperplasia, is associated with tumor development. Benign and malignant tumors occur in beagles given progesterone as well as in those given certain synthetic progestins derived from progesterone (82, 160). In fact, several researchers have concluded that any progestin may stimulate breast tumors in beagles if given by an appropriate route at high continuous doses for several years (2, 71, 143). The development of breast nodules in beagles receiving progestins appears to be related to increased levels of growth hormone (143, 160). DMPA does not increase growth hormone levels in women (122, 445, 627).

Another difference is that beagles may have reservoirs of microscopic neoplasms in the breast (80). These lesions may grow and develop in response to progestins, especially those derived from progesterone, such as DMPA (70). Apparently women do not have such lesions (70, 568). Also, other side-effects of large doses of progestins that are seen in dogs are not seen in women, further indicating differences in response. These side-effects, not directly related to breast tissue growth or tumor development, include pyometra (a type of uterine infection) and acromegaly (an abnormal growth condition) (52, 123, 445, 486, 527).

Important differences in response to progestins are seen at the cellular level as well. In the beagle, administration of progesterone markedly increases the number of progesterone receptors in both the breasts and in the endometrium (71). By contrast, in women progesterone decreases the number of progesterone and estradiol receptors in uterine tissue (366, 517, 560, 619). Receptors are specific proteins in cells that bind chemically with a hormone, causing a cellular response (490). The more receptors for a specific hormone, the stronger the response (132, 366).

Due to the differences between beagles and humans, a number of researchers and four panels of experts—the WHO Toxicology Review Panel, the IPPF International Medical Advisory Panel, the Committee on Safety of Medicines in the United Kingdom, and the Ad Hoc Consultative Panel on Depot Medroxyprogesterone Acetate, which was convened on behalf of US AID to study DMPA—have concluded that the beagle is not an appropriate animal for evaluating the safety of contraceptive hormones (2, 4, 48, 70, 71, 143, 186, 210, 211, 229, 531, 576, 597). In the United Kingdom the Licensing Authority no longer requires that products containing progestins be tested in beagles (597). While the US FDA still requires beagle studies, the agency's Fertility and Maternal Health Drugs Advisory Committee has recently recommended that a panel of experts review the US FDA requirements for toxicological testing of progestins in animals (523).

In monkeys, breast nodules were palpated during the course of the study in 8 of 20 animals receiving one or ten times the human equivalent dose of DMPA. They were palpated in 2 of 18 controls. Most of these nodules disappeared later. At the end of the study, when the monkeys were sacrificed, nodules

Table 5. Mammary Nodules in Beagles Treated with DMPA and in Controls, IRDC and Dawson Studies

IRDC Study

	Controls	DMPA Dose 1x	DMPA Dose 25x
No. examined	16	4	16
No. with nodules	9[a]	3	12
No. with malignancies	0	0	2[b]

Dawson Study

	Controls	DMPA Dose 1x	DMPA Dose 10x	DMPA Dose 25x
No. examined	20	20	20	20
No. with nodules	2	13	15	12
No. with malignancies	0	7	10	9

	Controls	Progesterone Dose 1x[c]	Progesterone Dose 25x[c]
No examined	20	20	20
No. with nodules	0	13	4
No. with malignancies	0	0	2

[a] Nodules transient in 7 of 9 animals

[b] Adenocarcinomas with metastases to other organs

[c] Progesterone given in amounts equivalent to (1x) or 25 times the normal human luteal phase level of progesterone

Source: IRDC study—Frank et al. (160), Upjohn (527); Dawson study—Carlson (83), Frank et al. (160), Upjohn (527).

were found in three DMPA-treated monkeys. The nodules were apparently focal nodular hyperplasia, an abnormal but benign growth of normal tissue. No tumors were found in monkeys receiving 50 times the equivalent human dose (527). Information on NET EN is not yet available.

Endometrial Cancer in Monkeys

Endometrial cancer was discovered in 2 of 12 autopsied monkeys receiving 50 times the equivalent human dose of DMPA (527) and, as of early 1983 in an ongoing study, one of 24 receiving 50 times the equivalent human dose of NET EN (568). None has been found in controls in these studies. Several cases of endometrial cancer have been reported in other monkeys not exposed to progestins (527), but the incidence of the disease is unknown.

As with the breast tumors in beagles, the relevance of these findings to women has been questioned:

- In the monkeys, the endometrial cancer occurred in an atrophic, or atrophied, endometrium (527, 646). In women endometrial cancer is often linked to hyperplasia (abnormally rapid growth of normal cells) induced by estrogen (4, 171, 462). DMPA and other progestins suppress endometrial growth and prevent hyperplasia in women (305, 344).
- Some pathologists contend that the endometrial cancers in monkeys are of a different cell type from endometrial cancers in women (527, 529, 568).
- One pathologist hypothesizes that the tumors in DMPA-treated monkeys originated from an epithelial plaque that forms in response to progestin or progesterone (529). This structure does not occur in women (4, 462).
- With hormones, large doses such as those given to the monkeys that developed endometrial cancer may cause qualitatively different effects from low doses (4, 523). Furthermore, because monkeys cannot metabolize these large doses fast enough, the drug accumulates in the body over time, so that the animals are eventually exposed to far more than 50 times the equivalent human dose.

In the recent hearings before the US FDA Public Board of Inquiry on DMPA (see p. K-20), a pathologist suggested that the monkey tumors were not endometrial cancers, but instead a rare type of cancer, adenocarcinoma of the endocervix (the inner wall of the cervix), which had spread to the endometrium (120). Subsequently, a group of pathologists convened by WHO reviewed uterine tissue slides from the three monkeys with cancer and from other monkeys. They concluded that the three tumors were probably endometrial in origin and unlikely to be endocervical (646). Also, in contrast to earlier opinions (568), they decided that all three tumors were of the same cell type (646). The tumor cells resembled endometrial plaque cells but not enough is known to be certain whether or not the tumors developed from the endometrial plaque (646).

Human Studies Show No Risks

Three types of evidence suggest that progestin injectables do not cause cancer in women:

- the results of epidemiologic and clinical studies to date,
- the fact that progestins are used therapeutically with some success to treat certain cancers,
- the findings of studies on oral contraceptives, which show no additional risk of breast cancer and suggest a protective effect against endometrial and ovarian cancer.

No epidemiologic study has yet demonstrated that injectables are linked with any type of cancer. Most of the studies, all of which have been on DMPA, have involved short-term users, however, and so would not be able to detect risks for long-term users, if such risks exist (216).

Preliminary results from the most powerful study to date show no risk of cervical or breast cancer with DMPA use. WHO is conducting a case-control study at 11 centers in nine countries. The study is investigating current or past use of oral contraceptives and injectables among women with cancer of the reproductive organs, breast, liver, or gall bladder and among women without cancer. Preliminary analyses concerning DMPA have been conducted on data from the three participating centers in Thailand, where DMPA has been used for almost 20 years. By early 1983 the WHO study had collected more than 500 cases of cervical cancer and compared them with more than 1,800 controls. Preliminary analysis detected no relationship between DMPA use and either invasive or *in situ* (noninvasive) cervical cancer. By early 1983 the study had a 90 percent chance of detecting a risk as low as 1.6 times greater for users than nonusers (647).

The WHO study also has collected more than 100 cases of breast cancer in Thailand and compared them with more than 1,800 controls. The preliminary results indicate no increased risk of breast cancer with DMPA use and may suggest a slight protective effect. By early 1983 the study had a 90 percent chance of detecting a relative risk as low as 2.5 (647).

The numbers of cases of other cancers, including endometrial cancer, collected by WHO have been too small to analyze. WHO notes, however, that:

> . . . the paucity of cases of cancer of the uterus, ovary, and hepatobiliary organs [liver and gall bladder] with a history of DMPA use, in a country where DMPA use is reasonably widespread, is reassuring. The data do suggest that no substantial public health problem due to DMPA exists, at least regarding these cancers. (647)

Because the WHO study is taking place in Thailand, where DMPA has been available for many years, it can evaluate longer use of DMPA at an earlier period than studies elsewhere. Some 191 of the controls thus far recruited to the study had used DMPA. Of these, about 40 percent had used the injectable for six months to three years, and about one-quarter had used the injectable for more than three years. Over half of the users among the controls had first used DMPA more than nine years before the study began (647). The WHO study is ongoing, and, although the preliminary results are reassuring, further analyses and additional data are needed before more definitive conclusions can be drawn.

Two recent US studies report no increased risk of breast cancer in women who had used DMPA for short periods (194, 288). A case-control study involving 30 women with breast cancer and 179 controls without breast cancer found that the two groups of women were equally likely to have used DMPA. Only one case had received more than two DMPA injections. The researchers point out that the small number of cases studied and the short average duration of use limit generalization from this study to other groups of women (194).

The second US study compared the incidence of breast, ovarian, and uterine cancers in women who had received DMPA at a hospital family planning clinic with the expected number of cases, based on age- and race-adjusted cancer rates in the US. There were no significant differences between the observed and expected numbers of any of these cancers. The study covered 5,000 DMPA users 4 to 13 years after their first injection. Most had used DMPA for less than one year. There were eight cases of reproductive cancers among these women—six breast cancers, one uterine cancer (leiomyosarcoma, not endometrial cancer), and one ovarian cancer. Most of these were also short-term users. The researchers note that their study was limited in its ability to detect a weak carcinogenic effect or one that appeared only after a long latent period. They conclude, however, that the results indicate that a strong association between DMPA use and these cancers is unlikely (288).

In a recent Canadian study of institutionalized mentally retarded women using DMPA, three women had died of breast cancer. This number is higher than the expected number based on the rate in the general population (591). These women are not comparable to the general population, however, since almost all were nulliparous—which increases breast cancer risk over that in the general population (625)—and many had received a wide variety of medications and treatments for long periods (591). Thus no conclusions can be drawn from this report (216).

Concerning endometrial cancer, there are no results of controlled studies yet available involving DMPA or NET EN for contraception. Edwin McDaniel and Malcolm Potts found no increase over time in the annual number of hospitalizations for endometrial cancer cases in Chiang Mai Province, Thailand, between 1974 and 1978. Of the 16 women hospitalized with endometrial cancer from 1974 through 1978 who, by reason of age and area of residence, might have used DMPA, 9 could be followed up. None had used DMPA (312, 327). Since 1979 the series has been expanded to 14 cases. None had used DMPA (633). The number of women is still small, however, and the report is based on hospital records that may be incomplete and could not take account of women who did not go to hospitals.

Evidence from Therapeutic Use

Further evidence against a link between DMPA and cancers comes from studies of women using very large doses for purposes other than contraception. Women receiving large doses of DMPA or oral MPA to treat endometrial cancer or postmenopausal symptoms show no increase in risk of breast tumors (61, 62, 357). For example, in a study of over 100 women taking one gram of MPA orally per week—about 80 times the contraceptive dose—for several years, no sign of breast dysfunction or dysplasia (development of abnormal cells) was observed (61). Oral MPA or DMPA used to treat breast cancer leads to partial remission in about one-third of cases (292). Occasionally, however, symptoms may worsen (264).

Concerning endometrial cancer, the addition of progestins, including MPA, to estrogens used to treat symptoms of the menopause reduces the incidence of hyperplasia and cancer associated with such therapy (74, 171, 203, 357, 493, 504). Also, DMPA is an effective treatment for endometrial cancer and is approved for that use by US FDA. Large doses are given to women with metastatic or recurrent endometrial cancer or are used before hysterectomy (22, 62, 63, 72, 400, 438). Complete or partial remission of metastatic cancer occurs in 18 to 57 percent of cases (63, 400).

Evidence from OC Research

Research on combined estrogen-progestin oral contraceptives shows no added risk of breast cancer and a protective effect against endometrial cancer, ovarian cancer, and benign breast tumors in women (see **Population Reports**, *Oral Contraceptives in the 1980s*, A-6, May–June 1982). The largest case-control study to date has found no increase in breast cancer risk for pill users as a whole or for any subgroup (631). Even OCs containing chlormadinone acetate and megestrol acetate have not been linked with breast cancer (534). (These progestins, like DMPA, have caused breast nodules in beagles (150).) Women taking OCs are significantly less likely to develop benign breast disease, with greater protection at higher progestin doses (608). The relationship between benign breast disease and breast cancer is not clear, however.

Women using combined oral contraceptives are protected against certain reproductive cancers. Women who have used OCs have one-fifth to one-half as much risk of developing endometrial cancer as nonusers (224, 251, 439, 555). Higher progestin doses may offer more protection (224). Oral contraceptives also protect against ovarian cancer (610, 612, 626, 630, 644). The protection increases with longer use and may persist for more than 15 years after first use (612). This protection is thought to result from the prevention of ovulation (614, 629, 649).

Regulatory Issues and Future Research

The apparent conflict between the animal studies and the human evidence concerning DMPA poses a dilemma for drug regulatory agencies. Should these agencies rely on the clear but possibly irrelevant evidence from the animal studies or on the relevant but less conclusive evidence from the human studies to date?

The position of the US FDA is to rely on the animal studies. Officials say that they would approve Depo-Provera for contraception only if the Upjohn Company could prove that (1) the dog and monkey findings are clearly inapplicable to women, (2) well controlled human studies demonstrate that

DMPA is safe, or (3) there is a defined group of US women for whom the benefits of Depo-Provera outweigh the risks suggested by the animal studies (502). Other drug regulatory agencies in Europe and elsewhere have reached other conclusions, approving DMPA on the basis of the same evidence. As a former US FDA commissioner, discussing Depo-Provera, stated, "...a decision about the appropriateness of a contraceptive drug for the United States would not necessarily apply to any other nation, let alone all" (256).

Since the relevance of the animal studies is being seriously questioned, scientists, family planning providers, and regulatory agency officials are anticipating the results of additional studies in humans to clarify the issue of injectable progestins and cancer risk. What studies would be necessary to resolve these issues? How should they be conducted? Who should conduct them?

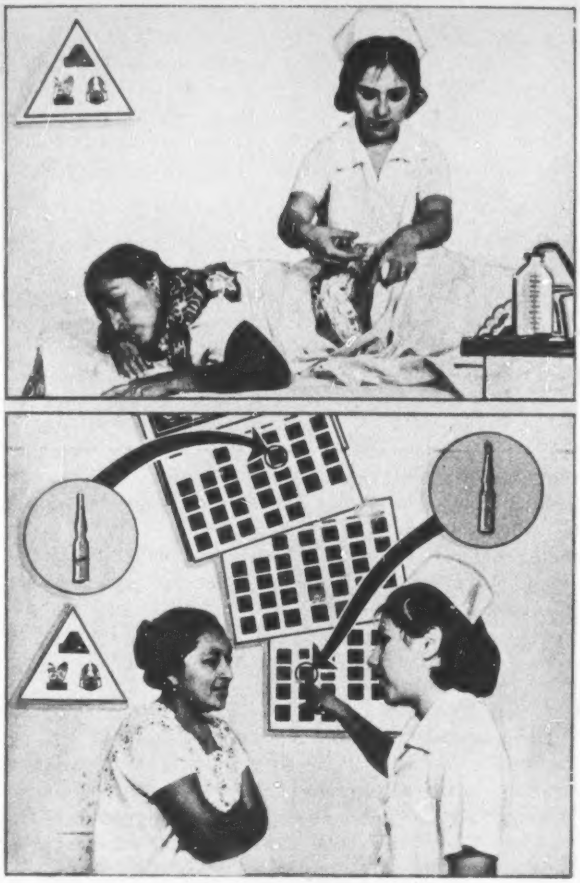
Such studies are expensive. For example, a multicenter study in the US, aimed at gathering about 8,400 cases of breast, endometrial, or ovarian cancer and about 6,000 controls in order to produce definitive conclusions about these cancers and oral contraceptives, is costing about $6.5 million (US), or about $500 per subject (640). The WHO 9-country study on hormonal contraceptives and cancer cost about $1.2 million (US) in the first three years (648). Thus, who should pay for these studies—governments, manufacturers, or both—becomes an important issue.

The ongoing WHO case-control study will provide the most definitive answers yet to the cancer question. The study will collect enough cases of reproductive and breast cancers to be able to detect an increase in risk as small as twofold (579). Other studies underway include a cohort study in New Zealand chiefly comparing the risks of developing cervical dysplasia or cancer in 7,500 women using either oral contraceptives, DMPA, or IUDs. The women will be followed for up to five years. This study is being funded by the Upjohn Company but directed by an independent committee. The Upjohn Company is also supporting a cross-sectional study in Kenya. The incidence of cervical abnormalities, endometrial changes, and breast tumors in women who have used DMPA for five years or more will be compared with incidence in women using OCs, IUDs, other methods, or no method. Both studies also will look at hospitalizations and deaths in all groups (527).

Ultimately, each national regulatory body or program must weigh the evidence and reach its own conclusion about the risks and benefits. Such decisions involve not only scientific data and interpretations, but also nonscientific factors, including the values placed on benefits and possible risks, the regulatory agency's perception of its responsibilities, and political pressures. In the field of contraception, the evidence on safety is far more substantial than evidence about many other widely used products. While no evidence can conclusively prove a lack of risk, carefully controlled research on large numbers of women is now underway to provide a stronger scientific basis for future regulatory decisions.

CONTINUATION AND ACCEPTABILITY

Continuation rates for injectables vary widely. They depend mainly on the willingness of users to tolerate menstrual disturbances. About 50 to 75 percent of women who start using 3-month injectables are still using them a year later (129, 258, 271, 320, 326, 460, 570, 580). These rates are comparable to those for oral contraceptives (272, 309) and slightly lower than those for IUDs (see **Population Reports**, *IUDs: An Appropriate Contraceptive for Many Women*, B-4, July 1982).



Long-acting injectables are easy to use, and this is one reason for their popularity. A pamphlet prepared by PIATA Mexico shows that an injection of NET EN is needed only once every two months. (PIATA Mexico)

Continuation rates for NET EN and DMPA are similar. The second WHO trial reported life-table continuation rates for NET EN of 50 per 100 women at one year for both the 8-week regimen and the 8/12-week regimen. The rate for DMPA was 48 per 100 (580) (see Table 4). The first WHO comparative trial reported significantly more discontinuation of DMPA than of NET EN, but the difference was because of one center—Chandigarh, India—where a very high percentage of women stopped using DMPA. Discontinuation rates excluding Chandigarh were not significantly different (570). Continuation rates with higher doses of DMPA given every six months range from 41 to 86 percent at one year—slightly higher than reported in studies of the 3-month schedule (260, 324, 325, 416, 459).

Dissatisfaction with Menstrual Disturbances

Dissatisfaction with injectables stems largely from disruptions in menstrual patterns (see p. K-26). Bleeding irregularities cause 20 to 25 percent of women to stop using injectables (580). In the Thai National Family Planning Program, for example, a survey of 624 women found that menstrual disturbances accounted for twice as many discontinuations as all other side-effects combined (358). In the first WHO trial up to 65 percent of all discontinuations among DMPA users and up to 45 percent among NET EN users were caused by bleeding problems (191). Tolerance of menstrual disturbances varied. For example, bleeding patterns were very similar among women in the two Indian centers, Chandigarh and Bombay, but discontinuation for bleeding problems was 3 to 10 times greater in Chandigarh (187).

Prolonged amenorrhea and prolonged bleeding cause the most dissatisfaction. Ronald Gray and colleagues found that women who bled for a total of more than 30 days in a 3-month interval were three times as likely to discontinue use as women who bled less. Similarly, women who were amenorrheic for three months were three times more likely to discontinue use than women who menstruated at least once between injections (191).

Women may tolerate bleeding irregularities better if they and their partners are counseled before the first injection and repeatedly assured at later injections (41, 569). In Sri Lanka some programs routinely do pelvic examinations at each follow-up visit to reassure the woman that she is not pregnant (41). Clinicians from various areas report that, once women are reassured that amenorrhea is not harmful, some are pleased by the absence of menstruation (271, 284, 347).

Amenorrhea may be a formidable barrier to the use of injectables by some women, even though it does not threaten their health. In some cultures women believe that menstruation is essential to rid the body of "bad blood." In a number of African, Asian, and Middle Eastern countries they believe that, without regular menstruation, blood accumulates in the body, causing headaches, lethargy, insanity, and debilitation (41, 163, 242, 248, 250, 320, 356, 389, 566). A WHO study of menstruation, involving over 5,300 women in 10 countries, found that many women associate amenorrhea with menopause, infertility, and the onset of old age. In the 10 centers surveyed, 50 to 91 percent said that they would not use a contraceptive method that caused amenorrhea. Younger, better educated urban women were the most willing to tolerate amenorrhea (566).

Prolonged and irregular bleeding can seriously disrupt a woman's daily life. In Muslim societies, for example, women are not supposed to pray when they are bleeding (558). In many cultures sexual intercourse during menstruation is either prohibited or considered inappropriate or unhealthy (242, 566). Thus husbands may object to their wives using injectables (242). Other activities, such as cooking or visiting friends and relatives, may also be prohibited by custom (242, 558, 566).

Reaction to Other Side Effects

By comparison with menstrual disturbances, other complaints among users of injectables rarely lead to discontinuation. In the first WHO trial, for example, life-table discontinuation rates at one year for side-effects other than menstrual problems were 1.6 per 100 women for NET EN and 3.1 for DMPA (570) (see Table 4). Other studies report similarly low discontinuation rates (89, 258, 271, 328, 459, 460). Relatively few women stop using injectables because of weight gain. In the Upjohn Company's cooperative studies, involving mainly US women, only 1.7 percent dropped out for this reason in three years (459). In fact, in some developing countries women consider weight gain a benefit of injectables (24, 89). Other complaints among users of injectables, including headaches, abdominal discomfort, and anxiety and nervousness, cause one to two percent to discontinue use (164, 570).

Popularity of Injectables

Many women find injectables to be a highly satisfactory contraceptive method. In family planning programs where women are offered a choice among methods that includes injectables, generally between one-quarter and three-quarters choose injectables (56, 90, 217, 258, 314, 390, 467, 484, 581). The mode of administration partly explains this popularity. In many developing countries people like injectable medications because they have proved so effective against disease. In Thailand, for example, respect for injections dates back to injections of penicillin in the successful yaws eradication campaign of the 1950s and to the continuing effective use of other injectable antibiotics (358).

Injectables also are popular because they are easy to use. Many women prefer a single injection every several months to taking a pill or charting basal body temperature every day. The injection is not related to the timing of coitus, and women do not have to buy or store supplies. Injectables can be discontinued after three months simply by not having another injection, whereas an IUD or nonbiodegradable implants must be removed by a trained health worker. Also, injectables are administered outside the home. A woman can maintain her privacy, and, if necessary, she can use an injectable without the knowledge of her husband or family (242, 329, 390).

Like combined estrogen-progestin OCs, injectables are highly effective in preventing pregnancy. Unlike OC users, however, women using progestin-only injectables do not experience the minor side-effects associated with estrogen, such as nausea, or the rare but more serious hazard of blood clots. In addition, women who are breast-feeding may prefer a progestin-only method since estrogen can suppress milk production (see p. K-30).

ONCE-A-MONTH INJECTABLES

Research on once-a-month injectables—both combined estrogen-progestin and progestin-only formulations—has been underway since the early 1960s. While more than 15 formulations have been developed, only 3 have been tested in large numbers of women, and only 2 formulations are marketed. Monthly injections of progestins—with or without estrogen—involve a lower dose of hormone per month than 3-month injections. Effectiveness is high, and side-effects such as irregular bleeding and amenorrhea are less frequent than with 3-month doses. These advantages must be weighed against the inconvenience and higher cost of 12 rather than 4 injections per year and the possible side-effects of the estrogen in some products. Where once-a-month and 3-month injectables are sold in the same outlet, reportedly once-a-month formulations are often more popular (404). This may be because monthly use corresponds with the menstrual cycle or because the pharmacist promotes the monthly product more actively.

A monthly injectable combining 150 mg of dihydroxyprogesterone acetophenide and 10 mg of estradiol enanthate is marketed by at least eight drug companies in Latin America and Spain under various trade names including Perlutal and Tobasel (183, 513). A monthly dose consisting of half of these amounts is sold by at least four drug companies in Latin America (199). In the US, Squibb Pharmaceutical Company withdrew the higher dose product, called Deladroxate, from clinical testing in the late 1960s because: (1) toxicology tests showed breast tumors in beagles and pituitary hyperplasia in rats and (2) the distribution and excretion of the estrogen component in the body could not be completely determined (183, 513).

Deladroxate has been tested in over 20,000 cycles. No pregnancies have been reported. Irregular bleeding occurred in about 25 percent of the cycles. The percentage of women discontinuing the drug because of bleeding problems ranged from 7.5 to 26 percent (107, 183, 544). As with DMPA, the return of fertility may be delayed. Women have become pregnant between one and 39 months after discontinuing injections (253, 544).

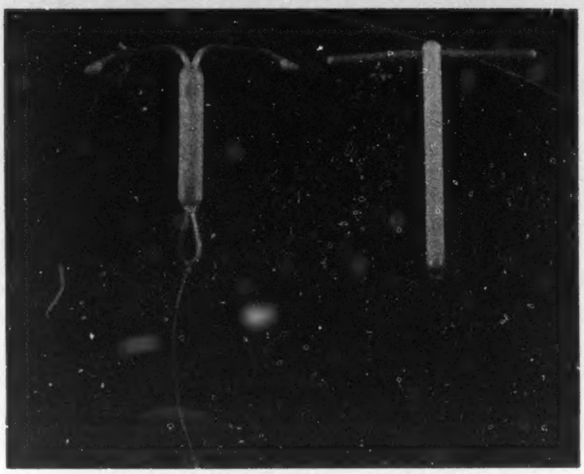
Another widely tested monthly injectable, Cyclo-Provera, also provides virtually complete contraceptive protection and relatively good menstrual cycle control (183, 513). While earlier formulations of Cyclo-Provera involved higher doses (60, 464), the regimen currently studied involves 25 mg of DMPA and 5 mg of estradiol cypionate every 28 days. In a Thai study, more than 80 percent of 111 women using Cyclo-Provera reported just one bleeding episode per cycle, and only 7 percent of the women did not menstruate for more than three months. The continuation rate at one year was 79 percent, and at two years, 44 percent (270). Weight gain is a common side-effect. Blood serum tests and blood pressure measurements show no change during use (60, 105, 153, 270, 442, 464). Recent research on plasma levels suggests that the dose of Cyclo-Provera could be reduced further (60, 269). WHO is studying injections with 12.5 mg of DMPA and 2.5 mg of estradiol cypionate (202). Cyclo-Provera is not currently marketed.

In the People's Republic of China, Injectable No. 1—consisting of 250 mg of 17-Hydroxyprogesterone caproate and 5 mg of estradiol valerate—may account for one percent of all contraceptive use. About 10 million doses are manufactured each year. Two injections are administered during the first month of use and one injection every month thereafter (395). Chinese scientists are studying two new injectables. The first combines 25 mg of megestrol acetate with 3.5 mg of 17β-estradiol, and the other, 80 mg of NET EN with 5 mg of estradiol valerate (594).

WHO also is studying monthly injectables combining NET EN and estradiol valerate (183, 579). To determine the appropriate dose, studies of two regimens are under way—50 mg of NET EN with 5 mg of estradiol valerate and 25 mg of NET EN with 2.5 mg of estradiol valerate (202).

PROGESTIN-RELEASING INTRAUTERINE DEVICES

Natural and synthetic progestins were added to IUDs in the early 1970s. This marked the first time that contraceptive hormones were delivered locally rather than systemically (46). The only progestin-releasing IUD that is now marketed is the Progestasert, a T-shaped device that contains 38 mg of progesterone released at a constant rate of 65 μg per day for one year (15). This amount of progesterone does not prevent ovulation but does suppress normal cyclic changes in the endometrium, making implantation of a fertilized ovum unlikely (15, 463). A device containing 52 mg of progesterone and designed to last for more than two years was tested in a multicenter trial (579). The trial was stopped after pregnancy rates began to increase at 20 to 22 months (430).



Hormone-releasing IUDs reduce menstrual blood loss and thus may help prevent anemia. The Progestasert (right) releases about 65 μg of progesterone per day for about one year. The levonorgestrel IUD (left), not yet marketed, releases about 20 μg of hormone per day for at least seven years. With either IUD, few pregnancies occur.

The major advantages of the Progestasert compared with other IUDs are less blood loss and less dysmenorrhea (painful menstruation). The major disadvantages are the need for replacement once a year, intermenstrual bleeding and spotting, and possibly more ectopic pregnancies than with other IUDs (see **Population Reports**, *IUDs: An Appropriate Contraceptive for Many Women*, B-4, July 1982).

Both WHO and the Population Council are testing T-shaped IUDs that release levonorgestrel. The WHO device contains 10 mg of levonorgestrel. The low release rate—2 μg per day—is intended to avoid systemic effects. It is not intended to suppress ovulation but instead prevents pregnancies by means of local effects on cervical mucus and the endometrium. The estimated life span is 10 years (575, 579). No data on the clinical performance of this IUD are available.

The Population Council initially developed two devices—the first containing 43 mg of levonorgestrel released at a rate of 20 μg daily, the second containing 56 mg released at a rate of 30 μg daily (297, 376). Because of a slight change in the manufacturing procedure, a modified device containing 60 mg of levonorgestrel released at a rate of 20 μg per day has been produced and is now being tested (361). These Population Council IUDs—which release about 10 times as large a daily dose of levonorgestrel as the WHO device—prevent ovulation in about 20 to 30 percent of women in the first year of use (373, 374).

The progestin-releasing IUDs are highly effective. With the Progestasert, pregnancy rates are about 2 to 3 pregnancies per 100 women per year. With the Population Council levonorgestrel-releasing devices, pregnancy rates are even lower. In two years no pregnancies occurred among 163 women fitted with the 56 mg device. The 2-year pregnancy rate among 164 women using the 43 mg IUD was only 0.6. This is similar to the pregnancy rate for DMPA. (It is not clear what effects the release of progestin in the uterus would have on the developing fetus if pregnancy does occur.) Continuation rates at two years have been about 55 percent (297, 376).

The most frequent side-effect of progestin-releasing IUDs is intermenstrual bleeding or spotting. The total number of days of bleeding increases by as much as 42 percent over preinsertion levels (197, 282, 375, 376, 432, 525). In some studies, however, the total number of days of bleeding in each cycle gradually decreased over time (369, 376). In the first year of use, 5.6 to 11 percent of women have progestin-releasing IUDs removed because of bleeding and/or pain (15, 282, 369, 375, 376).

While progestin-releasing IUDs increase spotting, they also reduce the total volume of blood lost by as much as 40 percent (197, 297, 298, 302, 376, 444). In fact, in one study of over 300 women using levonorgestrel-releasing IUDs, 11 percent became amenorrheic in one year (375). The reduced blood loss may prevent anemia. Among women using progestin-releasing IUDs, average hemoglobin or serum ferritin levels are greater than preinsertion levels (206, 370, 423, 424, 575). Both the Progestasert and the Population Council levonorgestrel-releasing IUD also may reduce the incidence of dysmenorrhea by as much as one-third (174, 375, 545, 583).

Although evidence is still preliminary, the local effect of progestins on the endometrium and fallopian tubes may reduce the risk of pelvic inflammation or infection. Levonorgestrel thickens cervical mucus, which could prevent bacteria from entering the cervix. Also, the scant menstrual bleeding would not provide a medium for bacterial growth (296). In over 15,000 woman-months of use of the Population Council's levonorgestrel-releasing IUD, only three devices were removed because of pelvic infection—a rate of 0.24 per 100 woman-years of use (297). Preliminary studies on small numbers of women suggest that nonbacterial inflammation of the tubes occurs less frequently among women using the Progestasert than among women using other, nonhormonal IUDs (142).

Evidence suggests that ectopic pregnancy may occur more often in Progestasert users than in women using other IUDs. Pooled clinical trials show a rate of about five ectopic pregnancies per 1,000 woman-years for the Progestasert (14, 175) compared with 1.2 for the Lippes Loop and Saf-T-Coil and 0.96 for copper IUDs (473, 506). In trials of the Population Council's levonorgestrel-releasing IUD, one ectopic pregnancy occurred in over 1,660 woman-years of use (296). The rate may be low because this IUD prevents ovulation in some users.

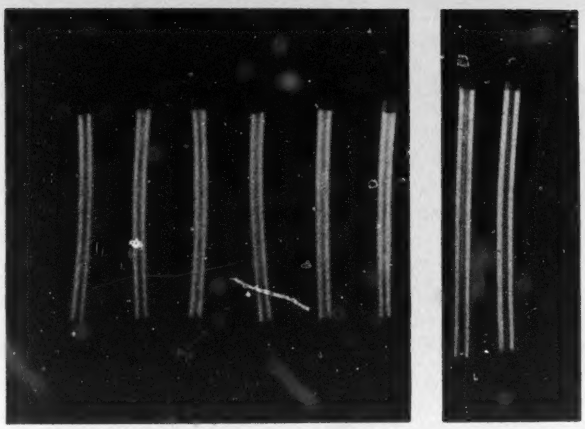
IMPLANTS

The first contraceptive implants, made of flexible, nonbiodegradable tubes filled with hormones and placed under the skin, were developed in the 1960s. Implants offer the possibility of long-term contraception without frequent medical intervention or continual action by the user (466). Also, continuous and relatively constant release of the drug (known as a zero-order release rate) is expected to cause fewer side-effects than either injectables, which create very high plasma levels of hormones initially, or oral contraceptives, which produce daily fluctuations of hormone levels (69, 469).

Mode of Delivery

Most implants are made from the elastomer polydimethylsiloxane (Silastic) in either of two forms:

- shaped into hollow capsules and filled with hormone or
- molded into solid rods impregnated with the hormone (see photo, this page).



Contraceptive implants containing levonorgestrel have been developed by the Population Council. The implants, placed just under the skin, slowly and continuously release progestin. Two systems are under study: one consisting of six capsules (left); the other, of two rods.

Most rods and capsules are 2 to 4 cm long with an outside diameter of 2.4 mm. They can be placed under the skin with a large hypodermic needle (10 to 11 gauge trocar) (110, 476). The implants must be inserted just beneath the skin, a procedure that requires a specially trained health worker. Local anesthesia is required, and the entire procedure takes 10 to 15 minutes. Removal also requires local anesthesia because a small incision—about 5 mm long—is made in the skin over the implants. If the implants have been inserted too deeply under the skin, into the muscle, they may be difficult to find and to remove. If the implants are inserted properly, however, removal is easier. The Population Council recommends placing implants on the underside of the forearm or upper arm. Implants placed in the buttocks or thigh tend to move under the skin and are more difficult to remove (501, 551). Implants that biodegrade, and so do not need to be removed unless a woman wants to become pregnant early, are now in the initial stages of development (see p. K-42).

The amount of hormone released by implants can vary greatly, depending on a number of factors. These include:

- **The type of hormone used**. Some hormones diffuse more rapidly than others, so the implant has a shorter life span. With hormones that diffuse slowly, the implant lasts longer, but more implants may be needed to supply a dose large enough to be effective. With all hormones the amount released declines over time, although with some the rate stabilizes after the first few months (364).
- **The surface area of the rod or capsule**. As the surface area of the implant increases, the rate of hormone release increases.
- **The type of implant**. Rods have a release rate three to four times greater than capsules because the hormone travels a shorter distance to reach the surface of the implant (364).
- **The number of rods or capsules used**. From one to 12 have been tested.
- **Sterilization of the implant**. Some rods and capsules should not be sterilized by irradiation since this tends to reduce the rate of drug release (364).

- **Characteristics of individual users** (277, 349, 363, 364, 551, 553). Why the release rate varies among women is not clear. In some women a dense fibrous tissue forms around the implants and may slow the release of hormone (238, 364), although this does not seem to increase pregnancy rates (238). The rate at which the drug enters the blood circulation appears to depend, in part, on the local blood supply, amount of body fat, and possibly an individual's physical activity (58, 111).

Hormones Tested

In the last two decades at least 10 compounds have been tested in implants in a total of over 5,000 women (97, 110). A number proved unsuitable for contraceptive use. For example, megestrol acetate, the first progestin tested in clinical trials of implants (99, 100, 115, 498, 499), was eliminated after toxicological tests in the early 1970s showed that it caused breast nodules in beagles (97). Progesterone and the progestin ST 1572 caused inflammation around the implant site (97). Chlormadinone acetate and the newer compounds lynestrenol and R 1364 diffuse through the membrane so rapidly that even four or five capsules would last less than one year (97). Gestrigone, also called methylnorgestrienone or R 2323, raised transaminase (liver enzyme) levels, suggesting impairment of liver function. It also caused androgenic side-effects such as acne and hair growth (12, 102, 112). Most recently, norethindrone and norethindrone acetate were tested and abandoned because pregnancy rates were too high (97, 114, 381, 382, 413, 496, 501, 562). Adding estrogen to the progestin implants also raised pregnancy rates (97).

The most promising hormones tested so far are:

- ST 1435,
- norgestrienone,
- levonorgestrel (98, 295).

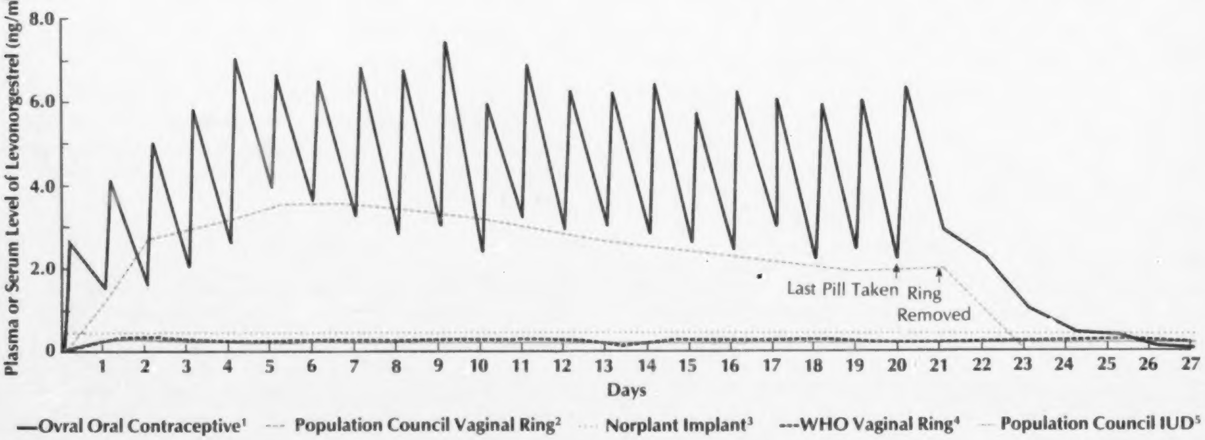
Clinical trials with one to five capsules of ST-1435, a progestin derived from testosterone, report pregnancy rates of one or less per 100 woman-years and few side-effects (103, 104, 295). These implants last only about six months, however (103). ST 1435 implants might be a good contraceptive for lactating women since ST 1435 secreted in breast milk may be inactive in infants (295).

Norgestrienone (or R 2010) implants also have a relatively short life span (101, 125, 471)—about 18 to 24 months for six capsules (97). In a double-blind randomized trial, the one-year life-table pregnancy rate was 3.5 per 100 women, significantly higher than the rate of 0.6 for levonorgestrel implants (402). Discontinuation for bleeding disturbances was significantly less frequent with norgestrienone implants, however—4.3 per 100 women at one year compared with 12.3 with levonorgestrel implants (402).

Levonorgestrel Implants

The Population Council, which has supported much of the research on implants, favors levonorgestrel because the drug diffuses slowly through the carrier and is highly effective in small amounts. The Population Council has developed and is testing two systems. The first, called Norplant, consists of six capsules, each containing 36 mg of levonorgestrel. The estimated effective life of this system is at least five years (124, 480).

Figure 5. Average Blood Plasma or Serum Levels of Levonorgestrel During First Month of Use of Five Contraceptives



[1] Each pill contains 250 μg of levonorgestrel (500 μg of d,l-norgestrel) and 50 μg of ethinyl estradiol. Source: adapted from Brenner et al. (69).

[2] Daily release rate for this ring ranges from 206 to 333 μg of levonorgestrel and 175 to 254 μg of estradiol. This ring, with an outside diameter of 61 mm, releases hormones at about the same rate as the 58 mm ring currently being tested by the Population Council. Source: adapted from Mishell et al. (342).

[3] Daily release rate for Norplant (6 capsules) is about 68 μg of levonorgestrel during first weeks of use, declining to about 40 μg by the end of the first year and about 30 μg by the end of the fifth year (635). Source: Croxatto et al. (111).

[4] Daily release rate for the WHO ring is approximately 20 μg of levonorgestrel. Source: Landgren et al. (279).

[5] Daily release rate for this IUD is about 20 μg of levonorgestrel during first year of use. Source: Luukkainen & Nilsson (297).

The progestin levonorgestrel is being used in a variety of contraceptive methods, including combined estrogen-progestin oral contraceptives, vaginal rings, IUDs, and implants. Average hormone levels in the blood plasma or serum of users reflect the different modes of administration. Oral contraceptives produce a daily fluctuation in levels. With the Population Council vaginal ring, which is intended to prevent ovulation, levels rise over the first week of use, then decline gradually. During subsequent periods of use the level is roughly constant at about 2 ng/ml. Levels of levonorgestrel remain low and constant with the WHO vaginal ring, which does not prevent ovulation consistently; with the Population Council IUD; and with the Norplant implant. With all hormonal contraceptive methods, levels vary considerably in different women.

In the first weeks of use the implants release a total of about 68 μg of levonorgestrel daily. The amount drops gradually to about 40 μg by the end of the first year and 30 μg by the end of the fifth year (635). This is about one-fifth as much levonorgestrel as in the lowest dose combined oral contraceptives. The Population Council has applied for registration of Norplant levonorgestrel capsules in Finland (476).

The Population Council also is sponsoring trials in the US, Europe, and Latin America comparing Norplant with the Norplant II system, which consists of two rods rather than six capsules. Each rod contains 70 mg of levonorgestrel. The daily release rate for both rods is about 50 μg (361). Because it consists of two rather than six implants, Norplant II may be less visible and easier to insert and remove. Thus it may be more acceptable to women. The Population Council plans to apply to US FDA for approval of Norplant II in the US (361).

Two long-term clinical trials of Norplant capsules report 3-year pregnancy rates below one per 100 women. In a Chilean study of 101 women, no pregnancies occurred in five years (124, 126). The life-table continuation rate at five years was 54 percent (124). A larger multicenter trial, conducted by the International Committee for Contraception Research (ICCR) of the Population Council in six Latin American and Scandinavian countries, reported a 3-year pregnancy rate of 0.7 (476).

There was one ectopic pregnancy with the levonorgestrel implants in the first three years of use, or 0.7 per 1,000 woman-years. It is not clear whether the frequency of ectopic pregnancies with the levonorgestrel implants will increase with duration of use. In the first year of use ovulation occurs in about 10 percent of menstrual cycles. In succeeding years, however, as the release rate of levonorgestrel declines to between 30 and 40 μg per day (635), ovulation occurs more frequently—in about 30 to 75 percent of cycles (113).

Side-Effects

Implants, like other progestin-only contraceptives, disrupt the menstrual cycle. In two studies life-table discontinuation rates for menstrual disturbances among women using Norplant capsules were 7 and 9.5 percent at one year. This accounted for about half of all first-year discontinuations (126, 476). Irregular and prolonged bleeding is the most common complaint (480).

Bleeding disturbances decrease over time. In the ICCR study, for example, in the first three months after insertion 36 percent of women experienced 31 or more days of bleeding; in the ninth to twelfth months, only 12 percent. Amenorrhea lasting more than 60 days occurred in 32 percent in the first three months and in 24 percent in the ninth to twelfth months (148). Using implants with a higher daily release rate of levonorgestrel appears to reduce irregular and prolonged bleeding and to increase amenorrhea (148). Despite frequent or prolonged bleeding with implants, the average menstrual blood loss may be less than before insertion and may decrease further with time (372). Average hematocrit and hemoglobin levels for women using Norplant with six capsules either do not change or else increase over time--a beneficial effect (12, 147, 372, 402).

Discontinuation for menstrual disturbances can be reduced substantially if women are counseled before insertion and during the early months of use. In one study the discontinuation rate among users who were not carefully informed about side-effects was 10.5 at one year (403). Among a second group of users, who were reassured that bleeding problems would subside and that the irregular patterns had no harmful effects, the rate was 5.2 (475, 476).

Levonorgestrel implants apparently cause few systemic side-effects apart from menstrual irregularities:

- Average weight gain is slight—between 1.4 and 2.7 kg in the first year of use (147, 403).
- No changes have been seen in blood pressure or in carbohydrate or lipid metabolism (112, 126, 147) or in transaminase (liver enzyme) levels (12, 112).
- In one study long-term Norplant users had lower total cholesterol and triglycerides levels than IUD users—a beneficial effect. HDL cholesterol levels were the same in the two groups (109).
- Reports on plasma cortisol levels are mixed, but clinical signs of hypoadrenalism have not been seen (109, 112, 126).
- Androgenic side-effects including hair growth and acne have occurred in up to 15 percent of the women in a 5-year study but have rarely led to discontinuation (124). In another study, however, these side-effects, which might be due to the progestin, were no more common in implant users than in women using copper IUDs (403).
- About 11 percent of the 101 women in the Chilean trials of Norplant had pain in the lower abdomen and temporary enlargement of the fallopian tubes or ovaries. One woman required surgery for enlarged follicular cysts. Symptoms subsided spontaneously in the others (126). Adnexal pain or enlargement also has been noted in up to 40 percent of women using implants with megestrol acetate and other hormones (114, 116).
- About 15 to 33 percent of Norplant users experienced headache, nervousness, or depression, but this was a lower percentage than in a control group using copper IUDs (403).
- Infection at the implant site is rare. Fewer than one woman in 100 has had any signs of local inflammation (476).

The contraceptive effect of Norplant implants is reversed by removal of the implants. Among 53 women who wanted to conceive, 77 percent were pregnant by one year after removal (474). Time to conception is not affected by duration of use (124, 474).

Acceptability

It is difficult to gauge the acceptability of implants in national family planning programs, since they have been tested only in relatively small clinical trials involving highly selected participants. Preliminary evidence suggests that the majority of users are highly satisfied. In the two clinical trials overall continuation rates at one year were 76 and 87 percent (124, 476). Acceptability varied in different countries, however. Two-year continuation rates ranged from 38 percent in the Dominican Republic to 75 percent in Chile (480).

About 80 to 85 percent of the women participating in the ICCR study recommended implants to their friends or relatives. Ease of use was the most frequently cited advantage of the method. Many women also liked the lack of side-effects, high effectiveness, and long duration of effectiveness. The major disadvantages cited by some women were menstrual irregularities and other side-effects. Most women felt little discomfort during insertion of the implants. About 30 percent found removal painful, however, and 10 to 12 percent reported minor irritation or annoyance during use of the implants (480).

Unlike other methods, implants are sometimes visible under the skin and may be noticed by family members and friends. This might disturb some women. The visibility of the implants did not cause many objections during clinical trials, however. About 40 percent reported that friends or relatives had noticed the implants. Only one-quarter of these women were perturbed by this. Only 7 percent considered the appearance of the implants to be the feature of implants that they most disliked (480). In contrast to the earlier practice of placing implants in the lower arm, implants are now placed in the inner side of the upper arm and so may be less visible (474).

VAGINAL RINGS

Hormone-releasing vaginal rings, first produced in the late 1960s and early 1970s, use carriers of Silastic (polydimethylsiloxane), the same material used in contraceptive implants. The rings, circular tubes containing hormone, are inserted into the vagina around the cervix. They are designed to remain in the vagina either for three weeks at a time or for about three months, depending on the type of ring. Unlike users of other long-acting methods, women can easily start and stop using vaginal rings. It is unclear, however, whether vaginal rings will be more acceptable than diaphragms or other barrier methods, which are less expensive and have virtually no side-effects.

Design

Vaginal rings have been made in various sizes and designs. Rings currently being tested have an outer diameter of 50 to 60 mm and are 7.5 to 9.5 mm thick. Unlike diaphragms, rings do not have to be precisely fitted, since they do not act as barriers to sperm (135). The size of the ring can affect the comfort of the user, however. Vaginal erosion and irritation are rare with currently used rings but occurred often with larger and stiffer rings and with thinner rings (339, 341, 345).

Rates of hormone release from rings vary widely, depending on the design of the ring as well as the solubility of the hormone (362). Four designs have been tested. The homogeneous ring, evenly impregnated with hormone throughout, released a great deal of hormone initially, followed by a marked drop (362). The banded, or collagen, ring contained all the hormone in a small collagen band molded to the outer circumference of the ring. The band often broke or came off the ring (170, 434, 539). These two designs have been abandoned. The shell and core rings are currently being studied by the Population Council and WHO. The shell design has a hormone-free inner core encircled by a narrow hormone-filled band, which in turn is covered by Silastic tubing. In the core design, all of the hormone is in a central 3.5 mm diameter core (278, 434). In both designs all the hormone travels about the same distance before it is released, so the release rate is relatively stable (434).

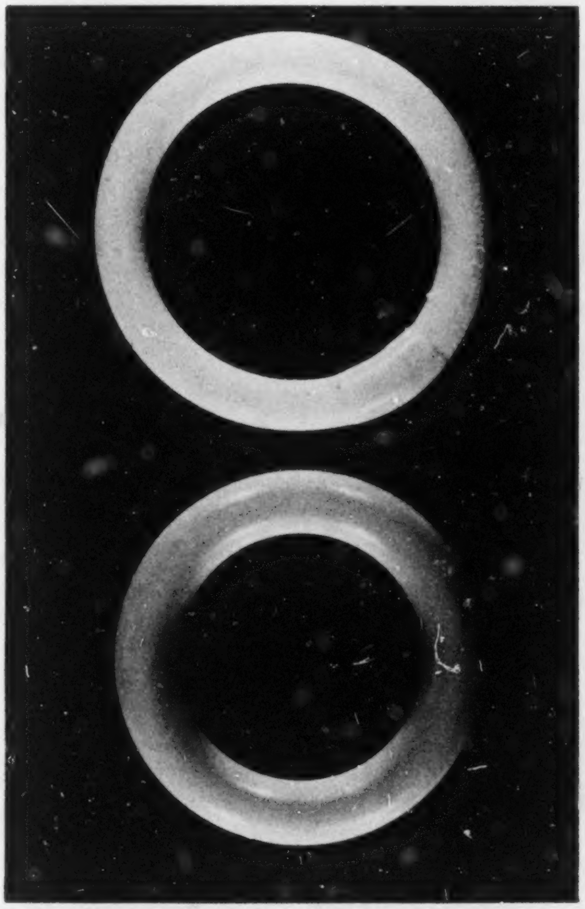
Development of vaginal rings has taken two different approaches. One approach is a ring that releases enough hormone to prevent ovulation. These rings are intended to be used intermittently. In the most widely tested regimen, the ring is left in the vagina for three weeks and then removed for one week to bring on withdrawal bleeding. Alternatively, it may be removed for up to five days at a time should breakthrough bleeding occur (511, 537). The only ovulation-preventing ring currently under study is a combined progestin-estrogen ring developed by the Population Council.

The second approach, followed by WHO and researchers in China (594), is a ring that releases low levels of progestin only. It is thought to prevent pregnancy through local effects on cervical mucus and the endometrium, not by preventing ovulation. The WHO ring is worn continuously for three months and does not need to be removed monthly (128, 380).

Combined Levonorgestrel-Estradiol Vaginal Ring

Early ovulation-preventing vaginal rings used progestins only. A number of hormones were tested and discarded because of frequent irregular bleeding and other problems (8, 241, 339, 341, 343, 345, 434, 508, 538, 540). In 1978 estradiol was added to a levonorgestrel-releasing ring to achieve a more regular bleeding pattern and to reduce the frequency of breakthrough bleeding (342). This combined ring is a shell design containing about 100 mg of levonogestrel and 50 mg of estradiol. Two sizes have been made—58 mm and 50 mm outside diameter (477). The average release rate—250 to 290 μg of levonorgestrel and 150 to 180 μg of estradiol—prevents ovulation in most cycles (342, 510). The rings are effective for at least six months (361).

Results of a recent, large, multicenter trial suggest that combined vaginal rings are as effective in preventing pregnancy as low-dose oral contraceptives. Over 1,100 women using the rings in two sizes were compared with 533 women using the low-dose combined OC Nordette, consisting of 0.15 mg of levo-



Vaginal rings can be inserted and removed easily by the user. The Population Council ring (top) contains levonorgestrel and estradiol and remains in the vagina for three weeks at a time. The WHO ring (bottom) contains levonorgestrel only and can stay in place for three months. Both rings cause some irregular bleeding and spotting.

norgestrel and .03 mg of ethinyl estradiol. The life-table pregnancy rates at one year were similar for all three groups—1.8 per 100 women using the 50 mm ring or OCs and 0.7 for women using the 58 mm ring (477).

In this trial similar percentages of women stopped using the two methods because of side-effects—at one year about 23 per 100 women using rings and 19 per 100 women using OCs. Side-effects differed, however. Vaginal problems—primarily discharge—caused 5 to 7 percent of ring users to discontinue the method, but none of the OC users. Medical examinations showed that vaginal problems, particularly vaginitis, leukorrhea, and other discharge, were significantly more common among women using rings than among OC users. Other side-effects, such as headache, nausea, and dizziness, were less common among ring users (478).

Despite the estrogen, breakthrough bleeding remains a problem. About 7 to 8 percent of women discontinued the rings because of menstrual problems compared with 4 percent of OC users (477). After the first month of use, women using the rings experienced an average of about five days of bleeding and spotting every month. Roughly 10 percent of the women, however, had four or more days of breakthrough bleeding or spotting during the three weeks while the ring was in place (479). In several smaller studies the frequency of breakthrough bleeding has varied (330, 342, 435, 509).

Other short-term side-effects of the combined ring appear to be slight. Hemoglobin and hematocrit, blood pressure, blood clotting factors, liver function, and carbohydrate metabolism are not significantly affected (7, 330, 342, 435, 478). Plasma levels of high-density lipoprotein (HDL) cholesterol are significantly lower, however (5, 426, 433), and remain low for as long as one year of use (6). This is thought to be an adverse effect, but the clinical significance of the change is not certain.

Long-term effects are unknown. Whether direct local administration of estrogen over extended periods of time has any long-term effects on the vagina and cervix remains to be determined (46, 128, 170). After one year of use cervical smears remain normal (330). According to an ongoing 2-year study by the Population Council, the rings produce primarily progestational effects on the vagina (361).

Low-Dose Levonorgestrel Rings

Since 1972 WHO has sponsored research to develop a vaginal ring with a low release rate. This ring is intended to prevent conception without consistently inhibiting ovulation and thus to reduce exposure to hormones. One of the first such rings released about 50 μg of norethindrone per day and resulted in a pregnancy rate of more than 6 per 100 woman-years (128, 170, 572, 578). Since 1980 research has focused on a ring that releases 20 μg of levonorgestrel per day for at least 90 days—the Varlevo-20 ring (579). This ring is a core design and contains about 6 mg of levonorgestrel (78). The outer diameter is 55.6 mm, and the ring is 9.5 mm thick (128). A clinical trial involving about 500 women is underway in 13 countries. WHO is developing another ring that will last for one year (431).

With the Varlevo-20 ring, normal ovulatory and bleeding patterns seem to be only slightly disrupted. In small trials ovulation has been suppressed in 20 to 50 percent of cycles (128, 279, 578, 579). Postcoital tests found cervical mucus impenetrable to sperm in 11 of 12 cycles (578). One method-related pregnancy has been reported in 554 woman-months of use (128). Irregular bleeding has not been eliminated entirely, but it is very slight on the average (128).

Acceptability

How acceptable vaginal rings will be is uncertain. Compared with other methods, the ring has a number of advantages. It is entirely and easily controlled by the user, yet no daily activity, such as taking a pill, is necessary. The ring remains in place and so, unlike the diaphragm, it does not have to be inserted before sexual intercourse. It requires relatively little care. On the other hand, rings may combine some of the inconvenience of a vaginal method with some of the systemic problems of hormones. Moreover, the idea of using a vaginal ring is unfamiliar. Women are required to handle their genitals and to leave an object in the vagina for a long period of time.

While the rates of discontinuation due to side-effects were similar in the major study comparing combined rings with OCs, significantly more ring users discontinued because of use-related problems—about 4 to 6 percent of ring users compared with 2 percent of OC users. Difficulty and "unpleasantness" with inserting and removing the rings were the major reasons. Also, several women lost their rings (477). Cleaning and storing the ovulation-inhibiting ring for one week per month may be difficult in some situations. Expulsion—partial or complete—was reported by 15 to 20 percent of ring users (477). Expulsions frequently occur when women squat or defecate (170, 330). In a one-year study of 39 women in India, women used combined progestin-estrogen rings with an outside diameter of 61 mm and a thickness of 9.5 mm. There were 16 expulsions, and three women discontinued use for this reason (330). WHO is considering the manufacture of rings in several sizes, suitable for either nulliparous or multiparous women, to reduce slippage and expulsion (579).

Vaginal rings are intended to remain in the vagina during sexual intercourse. Nevertheless, in one study in the Dominican Republic and Brazil about 25 percent of the women in both countries sometimes or always removed the ring before coitus. About 8 percent of the men in Brazil and 24 percent of the men in the Dominican Republic reported some discomfort from the rings during intercourse (146).

NEW RESEARCH ON LONG-ACTING METHODS

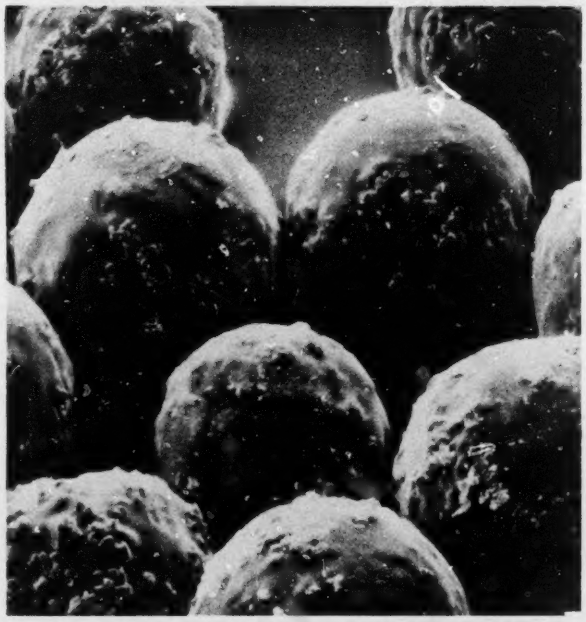
Research in this complex field, only briefly described here, focuses on efforts to:

- synthesize new long-acting hormones and
- devise new delivery systems.

Human testing of these new methods has been limited.

Biodegradable Systems

Biodegradable systems deliver a drug in a carrier that slowly dissolves in body tissue. Two types are being studied: (1) implants placed under the skin and (2) microcapsules—hormone in a biologically inactive polymer carrier—that are injected intramuscularly. Both methods permit a relatively constant release of hormone, avoiding the initial high levels that occur with injectables. There is no need to replace a biodegradable device after the hormone supply is exhausted, as with nonbiodegradable Silastic implants or progestin-releasing IUDs. In fact, most biodegradable systems, like injections, cannot be removed or their effects stopped if so desired (46, 601).



A new type of long-acting injectable consists of biodegradable microparticles that release small amounts of progestin for three to six months. This photomicrograph, obtained by scanning electron microscopy, shows norethindrone microcapsules, magnified 500 times. These microcapsules prevent ovulation for three months. (Courtesy of T.R. Tice)

A number of compounds have been studied as biodegradable carriers. They include poly (lactic acid) (44, 45, 46, 601), polylactide and polyglycolide (195), poly (ε-caprolactone) (399), polypeptides (639), and polyorthoesters (398, 601). WHO and the US National Institute of Child Health and Human Development (US NICHD) have conducted preliminary trials using biodegradable implant delivery systems consisting of carriers of polyorthoesters containing either norethindrone (BIDS-NET) or levonorgestrel (BIDS-NOG). Work on these implants has been discontinued because they caused local itching and inflammation (168, 579). US NICHD has begun toxicological tests on an implant, called Capronor, consisting of a single tube of poly (ε-caprolactone). The tube releases 20 to 40 μg of levonorgestrel per day and is effective for one year. The carrier can be removed if desired and will not biodegrade until two to three years after implantation—well after the drug supply has been exhausted (168, 579). Preliminary trials showed that Capronor prevented ovulation in eight women for one cycle each (632).

Lee Beck and colleagues have developed microcapsules of a copolymer of d,l-poly (lactic acid) and polyglycolic acid containing crystals of norethindrone (NET) (43, 287) (see photo, this page). An injection contains microcapsules of many sizes. Larger capsules release hormone at a slower rate than the smaller capsules. Thus both the number and the size of the microcapsules determine the rate and the duration of release of the hormone (44, 45, 505). In preliminary trials a 3-month injection with a total of 75 mg of NET released about 500 to 800 μg of hormone per day. This dose suppressed ovulation. All of the women had irregular menstrual cycles and spotting.

Research also continues on microcapsules containing norgestimate. Studies in baboons showed that norgestimate does not alter the endometrium or disrupt menstrual patterns (43). Microcapsules containing estradiol also are under development (43). US NICHD is sponsoring research on 6-month implants of polylactide microparticles containing levonorgestrel. Toxicological studies are planned to start in 1984 (168).

Injectables

Several new injectable hormones are under study. In Brazil, E.M. Coutinho and colleagues found that a 200 mg dose of a new progestin, ORG 2154, prevents ovulation for 5 to 10 months. Menstrual irregularities occurred similar to those with DMPA. Blood chemistry tests were normal (106). In West Germany preliminary animal studies suggest that 50 mg doses of either of two new progestin esters, NET glycotridecanoate and levonorgestrel glycotridecanoate, will prevent ovulation for four to five months (225).

Over 200 new long-acting progestin esters have been synthesized by research centers in the 12 countries participating in the WHO Chemical Synthesis Programme. US NICHD has screened these esters for biological activity (168). Four esters of levonorgestrel were active twice as long as DMPA. Toxicological tests in animals on the most promising of these esters began in 1982 (579), and it is expected that one ester will be selected for clinical trial in 1983 (648).

Once-A-Month Combined Pills

Several oral contraceptives taken only once a month are now used in China. Unlike most other long-acting hormonal methods, almost all once-a-month pills contain an estrogen, quinestrol, which is stored in body fat and released slowly over time (55, 308). The most widely used Chinese once-a-month pill combines 3 mg of quinestrol with 12 mg of d,l-norgestrel (144). Other progestins used include megestrol acetate, chlormadinone, and 16-methylene chlormadinone. About 3 million long-acting pills were produced in Beijing during 1979—enough for 200,000 women for a year (395). The first pill is taken on the fifth day of the menstrual cycle; the second pill, 20 days later. Thereafter one pill is taken every four weeks. This regimen appears to be highly effective, although exact effectiveness rates have not been reported (144, 594). Like daily oral contraceptives, the once-a-month pills temporarily increase levels of cholesterol and triglycerides and impair women's response to a glucose tolerance test. No significant changes have been seen in blood pressure or liver function. Animal and human studies suggest no added risk of breast nodules or cervical cancer, according to Chinese reports (144, 594). Endometrial hyperplasia was found in about half of the women using pills containing chlormadinone. By contrast, only one percent of women using once-a-month OCs containing d,l-norgestrel had endometrial hyperplasia (144).

In the US and Latin America research in the early 1970s focused on a pill containing 2 mg of quinestrol and 2.5 mg of the progestin quingestanol acetate. Research was abandoned because of high pregnancy rates (338, 547). Also, side-effects were common, including heavier and prolonged menstrual bleeding, nausea and vomiting, and increased mucus discharge (55, 281, 308, 338, 346).

A number of other long-acting contraceptive pills are in use in China. A once-a-month pill, Progestin No. 1, contains 50 mg of a new progestin, 3-cyclopentyl propionate of megestrol acetate, and 0.25 mg of the estrogen quinestrol. Also, since 1970 nine different "vacation pills" have been developed. These pills are designed for couples who live apart and meet only during vacations. Depending on the type and amount of hormone, some vacation pills are taken every day of the vacation; others, only twice a week or less often. Some pills, including those containing the synthetic hormone anordin, are taken only after coitus (594, 623). (See **Population Reports**, *Population and Birth Planning in the People's Republic of China*, J-25, January-February 1982.)

Male Contraception

Long-acting hormones that suppress sperm production are under investigation as contraceptives for men. Most researchers combine an androgen and a progestin. Both suppress pituitary production of follicle stimulating hormone (FSH) and luteinizing hormone (LH), which are essential for sperm production. Androgens studied to date include testosterone, testosterone cypionate, and testosterone enanthate. Progestins studied include DMPA, levonorgestrel, norgestrienone, NET, danazol, R 2323, megestrol acetate, cyproterone acetate, and norethandrolone (35, 274, 392, 546, 606). Also, implants containing the androgen testosterone and the estrogen estradiol cause complete and reversible sterility in rhesus monkeys. Human studies have not yet been conducted (293). The combination of levonorgestrel and estrone reduced but did not eliminate spermatogenesis in seven men studied (606).

Either an androgen or a progestin alone is unacceptable. Low doses of the androgen testosterone alone must be administered about four times a month to prevent sperm production. Higher doses, which last longer, increase sodium and water retention and change serum levels of lipoproteins (66, 392). Progestins alone also can prevent sperm production, but they depress testosterone levels, causing, at times, loss of libido, impotence, or breast enlargement (35, 66, 274, 392). An exogenous source of testosterone prevents these side-effects. Thus the combination of an androgen and a progestin has received the most attention.

According to C. Alvin Paulsen and colleagues, the most "effective and practical combination" tested is DMPA and an androgen (392). The WHO Task Force on Male Methods recommends further study of a monthly dose of 200 mg of DMPA and 250 mg of testosterone enanthate. Effectiveness trials have been delayed while studies are conducted to determine what effect, if any, this combination of hormones has on HDL cholesterol (648). In various regimens—monthly injections of 100 to 300 mg of DMPA plus either injections or Silastic implants of testosterone esters—more than 75 percent of the men showed declines in sperm production to less than 10 million sperm per ml of semen. Smaller percentages of men—from 14 to 79 percent—stopped producing sperm entirely (13, 69, 166, 283, 332, 392).

It is not clear how low sperm production must fall to prevent conception. The standard for male subfertility is usually 20 million sperm or less per ml of ejaculate. A recent review reports nine women impregnated by men whose sperm counts were below 10 million per ml, however. In five, the sperm counts were less than one million per ml. These data suggest that, for complete effectiveness, a male contraceptive must be able to stop sperm production entirely (38). No hormone combination yet studied does this at less than toxic doses.

Intracervical Devices

A number of intracervical devices (ICDs), which fit in the cervix and release drugs continuously, are under study. The first ICDs, developed in the early 1970s, contained progesterone or the progestin chlormadinone acetate or else the estrogens mestranol, estradiol, or estrone (93, 179, 192). More recent devices release about 10 μg to 20-25 μg of levonorgestrel per day (276, 301, 391).

Preliminary clinical trials do not show any advantages of the ICD over copper or hormone-releasing IUDs. Some report frequent expulsions, difficulty with insertion, and lower abdominal pain (73, 276, 391, 578). WHO has discontinued research on ICDs for these reasons (572). In the only large trial to date, the pregnancy and removal rates for an ICD releasing 10 μg of levonorgestrel daily were similar to the rates for the TCu-200 IUD but significantly higher than the rates for an IUD releasing 15.5 μg of levonorgestrel daily (301).

PROGRAM CHALLENGES

Of all the long-acting hormonal contraceptives, only DMPA has been widely used in family planning programs. Almost 20 years of experience with DMPA reveals few programmatic problems. Women often prefer DMPA to other methods. Nurses and auxiliary health workers can give injections and explain possible side-effects to women. Costs are low. The major problems with DMPA appear to be regulatory issues (see p. K-20). Once governments and family planning programs provide DMPA, however, they encounter little difficulty in service delivery.

In Thailand, for example, where DMPA is widely used, it was first introduced in 1965 by the McCormick Hospital Family Planning Program in the city of Chiang Mai. In 1967 both pills and injectables were offered to a rural area of Chiang Mai Province during monthly visits. Positive response led to the creation of a special mobile team to deliver services in rural areas. This mobile team—a physician, nurses, midwives, and aides—now reaches about 90 percent of the rural population of the province, visiting each village every three months to offer DMPA, oral contraceptives, and condoms (see photo, p. K-45). A subsidized price is charged for all services (15 baht, or $.75 (US) for a 3-month injection), but those unable to pay receive supplies and services free of charge.

The mobile team provides about one-half of all services delivered by the McCormick program. The other half is provided by the hospital and clinic in Chiang Mai city. Through mobile and stationary services about 9,000 doses of DMPA are distributed each month (319). The success of the program has been attributed to the strong demand for contraceptive services and to the high regard for injectable medicine among the populace (36). One problem with mobile services is ensuring that women receiving their first injection are not pregnant. Apart from the experience in Thailand, which has been widely reviewed and studied, there is very little published information on the use of injectables in other countries.

There has been virtually no program experience with other long-acting methods. The major problems that can be anticipated include:

- sources of supply,
- cost,
- training of personnel.

Sources of Supply

It is not clear how the newer long-acting methods will be distributed. Like some IUDs but unlike other contraceptives, rings and implants have been developed and tested by nonprofit, nongovernmental organizations rather than by commercial firms. Thus the products can be sold at a lower price than commercially developed products, but nonprofit organizations are unable to fund widespread advertising and promotion. They do not have a distribution network of suppliers, sales people, and detail men, as drug companies do. Furthermore, when nonprofit organizations grant licenses to commercial firms permitting them to market the product, the licensing agreement may stipulate a low sales price. The price may be so low that the firm is reluctant to spend money on advertising and distribution, especially if the new product competes with existing products that have higher profit margins.

Nonprofit organizations are arranging for promotion and distribution of implants and rings. Recently the Population Council made an agreement with Leiras Pharmaceuticals in Finland to manufacture the Norplant system of six capsules at a low price for distribution by governments and nonprofit organizations (361). Also, the Population Council has a contract with the Program for the Introduction and Adaptation of Contraceptive Technology (PIACT) to prepare for the introduction of the Norplant system in national family planning programs. Brochures and sample devices will be sent to family planning administrators, prominent physicians, and other decision-makers. PIACT also has prepared support materials describing the Norplant system for physicians, field workers, and potential users (393).

Efforts also are being made to distribute progestin-only vaginal rings at a low price. WHO has contracted with a British pharmaceutical company, London Rubber, to develop the equipment necessary to mass-produce 5,000 rings per day. A prototype of the production machinery is being built. The company also is developing packaging for the ring and determining its shelf life in tropical climates (579).

Local manufacture or packaging of contraceptives may increase their availability and reduce costs. Monthly and 3-month injectables are manufactured or packaged in a number of Asian and Latin American countries, including China, Thailand, Indonesia, and Mexico (133). Questions have been raised about the quality of locally formulated DMPA (412). The main potential source of problems is the particle size of the suspension in the depot formulation, which affects the rate of release from the injection site (165).

Local production of other long-acting hormonal methods is not feasible at this time. The manufacture of implants and vaginal rings has not yet been mechanized; the appropriate equipment is still being developed. It is unlikely in any case that most developing countries would produce either Silastic or hormones. Also, working safely with hormones requires a high degree of expertise (306, 425).

Cost

The cost of long-acting methods varies greatly. Some are as inexpensive as the pill, but others are more expensive. Donor agencies buying bulk quantities of DMPA and NET EN for family planning programs pay $1.00 (US) per dose (30, 117). Thus a year's supply of DMPA costs $4.00. DMPA produced by other manufacturers and packaged locally may sell for one-half of that price. In Thailand locally packaged DMPA costs about $0.50 per 3-month injection, or $2.00 per year (315). By comparison, the price paid by UNFPA and US AID for a packet of oral contraceptives is about $.15 per cycle, or about $2.00 for a year's supply. For a woman buying an injectable from a pharmacy or private doctor, in many developing countries the annual cost ranges from about $18 (US) to $75 (469).

The cost of implants, levonorgestrel-releasing IUDs, and vaginal rings, both to government programs and individual users, is not yet established, since these products are relatively new or experimental. It is estimated, however, that the Norplant system of six capsules will cost programs about $11.00 initially (361). If a woman uses it for five years, the price is slightly more than that of five years' supply of oral contraceptives at $.15 per cycle, about $10. Current vaginal rings are effective for three to six months. Unless they can be manufactured and distributed at a low price, they will be less cost-effective than injectables and implants.

The Progestasert IUD, by contrast, is much more expensive than injectables, implants, or pills. The public-sector price is about $8.40 for one sterile-packed IUD providing only one year of protection (543).

Buying contraceptive products in bulk is cheapest and can assure a family planning program of a ready supply. The long-acting hormonal methods have long shelf lives that make bulk purchases feasible. According to the manufacturers, both DMPA and NET EN can be stored for up to five years without refrigeration. The Norplant system and the Population Council's combined progestin-estrogen vaginal rings have a proven shelf

In Chiang Mai Province, Thailand, a mobile team of health workers from McCormick Hospital visits rural areas every three months to provide DMPA injections and other contraceptives on request. About 12 percent of contraceptors in Thailand currently use DMPA. (Courtesy of E.B. McDaniel)

GUIDELINES FOR USE

There are no known contraindications for use of long-acting progestin-only contraceptives by healthy women. WHO recommends that women with the following conditions not receive injectables:

- cancer of the breast or genital tract,
- abnormal bleeding from unknown causes,
- suspected pregnancy (569).

The best way to avoid giving an injectable to a pregnant woman is to give the first injection while she is menstruating or in the following week.

Since it is impossible to state conclusively what the appropriate contraindications should be, a WHO publication recommends careful consideration of the standard contraindications to use of combined OCs. Also, WHO advises that women with diabetes or a history of diabetes during pregnancy should be followed carefully, since DMPA has altered carbohydrate metabolism in some laboratory tests (569). Others point out, however, that a progestin-only method may be especially appropriate for women who do not use combined OCs for such reasons as concern about blood clots or a family history of cancer (404).

WHO recommends caution in supplying injectables to nulliparous women and to women over age 40 (569). There is no evidence to suggest that DMPA or NET EN will permanently affect fertility, however (see p. K-29). In fact, the only study examining the return of fertility in nulliparous women, involving 41 who had used DMPA, found that they conceived at the same rate as parous women who had used DMPA (387). Still, many family planning programs do not want to run the risk of inadvertently giving injectables to a couple who may already be infertile but might later blame the injectable. Thus programs often have limited DMPA to women who have had at least one pregnancy (26, 41, 96, 294). In women over age 40, the irregular bleeding patterns caused by injectables and other progestin-only methods could be confused with signs of menopause or gynecological problems (569).

Contraindications for vaginal rings and implants include active liver disease, jaundice, liver tumors, pregnancy, and uterine bleeding of unknown cause (361). Progestin-releasing IUDs, like other IUDs, should not be used by women who have congenital uterine abnormalities or have had pelvic inflammatory disease or an ectopic pregnancy (230).

life of six years and probably can be stored indefinitely (425). If packages get wet, however, they may no longer be sterile (425).

Training and Equipment

The expense of providing a method also includes the cost of ancillary equipment, training for health workers, and the delivery system. Injectables and vaginal rings can be provided by nurses or auxiliary health workers under the general supervision of a physician (146, 318, 569). They can be delivered in community-based distribution programs as well as by clinics. They also can be sold by social marketing programs and, in the case of injectables, administered by private physicians and other health workers who already give injections. Apart from a syringe for administering injections, no equipment is necessary.

Inserting and removing implants, like IUDs, requires special training. The Population Council recommends that physicians insert at least four or five implants under supervision (361). The doctor or other health worker may need to perform as many as 10 to 15 insertions before he or she feels comfortable performing the procedure (409). Auxiliary workers can learn to insert implants just as they have learned to insert IUDs and perform minilaparotomies for voluntary sterilization (88, 136, 575). In Chile and Brazil auxiliary workers have routinely inserted implants (145). Health workers removing implants would probably benefit from some experience or training in minor surgery (428).

Inserting IUDs and inserting and removing implants requires equipment and chemical disinfectants. Local anesthetic, sterile gauzes, and a trocar (hypodermic needle) also are necessary for inserting implants. Some physicians may choose to use a small scalpel as well (409). A scalpel and local anesthetic are necessary for removing implants.

Introducing a New Method

Family planning administrators must consider how to introduce a new method of contraception into a family planning program. Without careful planning and preparation new methods may be poorly accepted, dropout and pregnancy rates may be unacceptably high, and the reputation of the program may be damaged. Gordon Perkin and Lyle Saunders have suggested that family planning administrators introduce any new method on a limited basis at first—for example, in only one district or one province. Thus it would be possible, before planning a nationwide program, to determine the potential demand for the method, the best way to educate clients, the impact on other methods, and training requirements (396).

The attitudes and contraceptive practices of family planning clinic staff and of influential members of the community also affect acceptance of a new method (427). In preliminary trials of the combined progestin-estrogen ring in the Dominican Republic and Brazil, acceptance was significantly greater in clinics where the nurses decided to use the rings themselves (146). In Thailand, before setting up services, the McCormick Hospital mobile family planning services team always contacted the headman of each village to enlist his support and to take advantage of his influence with the community (36).

Different new methods may be more popular with different segments of the population. Implants and levonorgestrel-releasing IUDs, for example, are especially appropriate for women who want no more children but do not want voluntary sterilization (306). By contrast, injectables and vaginal rings are better suited to women who are spacing their children. Lactating women should be advised to use progestin-only methods, if they are available, rather than methods involving estrogen, since estrogen may decrease milk supply.

Overall, long-acting progestin methods of contraception can provide valuable contraceptive choices. Since no single method can meet everyone's needs at every stage of reproductive life, a wide choice of methods is desirable. Thus any of the long-acting hormonal methods—the well-established injectables and the newer implants, rings, and IUDs—can be expected to increase the use of family planning by providing additional options.

BIBLIOGRAPHY

Asterisk (*) designates an article that was of particular value in the preparation of this issue of **Population Reports**.

1. ANONYMOUS. Approval of Depo-Provera for contraception denied. FDA Drug Bulletin 8(2): 10-11. March-April 1978.

*2. ANONYMOUS. Hounding the pill. Medical Journal of Australia 2(8): 406-407. October 20, 1979.

3. ANONYMOUS. Pill users protected against PID if they have used OCs for longer than one year. Family Planning Perspectives 14(1): 32-33. January-February 1982.

*4. AD HOC CONSULTATIVE PANEL ON DEPOT MEDROXYPROGESTERONE ACETATE. Report to USAID of the Ad Hoc Consultative Panel of Depot Medroxyprogesterone Acetate, New York City, December 7-8, 1978. July 1980. 59 p. (Unpublished)

5. ÅHRÉN, T., LITHELL, H., VICTOR, A., VESSBY, B., and JOHANSSON, E.D.B. Comparison of the metabolic effects of two hormonal contraceptive methods: an oral formulation and a vaginal ring: 2. Serum lipoproteins and apolipoproteins. Contraception 24(4): 451-468. October 1981.

6. ÅHRÉN, T., LITHELL, H., VICTOR, A., VESSBY, B., and JOHANSSON, E.D.B. Serum lipoprotein and apolipoprotein changes during treatment with a contraceptive vaginal ring containing levonorgestrel and estradiol. Acta Obstetricia et Gynecologica Scandinavica 61(6): 499-504. 1982.

7. ÅHRÉN, T., VICTOR, A., LITHELL, H., and JOHANSSON, E.D.B. Comparison of the metabolic effects of two hormonal contraceptive methods: an oral formulation and a vaginal ring: 1. Carbohydrate metabolism and liver function. Contraception 24(4): 415-427. October 1981.

8. AKINLA, O., LÄHTEENMÄKI, P., and JACKANICZ, T.M. Intravaginal contraception with the synthetic progestin, R2323. Contraception 14(6): 671-678. December 1976.

9. ALEXANIAN, R. and NADELL, J. Oxymetholone treatment for sickle cell anemia. Blood 45(6): 769-777. June 1975.

10. ALI, M.N. and JALIL, M.A. Further study on the effect of norethisterone enanthate, an injectable contraceptive, on body functions. Bangladesh Medical Research Council Bulletin 4(2): 63-70. December 1978.

11. ALI, M.N., KABIRAJ, M.M.U., and FARIDUDDIN, K.M. Effects of norethisterone enanthate on certain body functions. Bangladesh Medical Research Council Bulletin 2(2): 139-143. December 1976.

12. ALVAREZ, F., ROBERTSON, D.N., MONTES DE OCA, V., SIVIN, I., BRACHE, V., and FAUNDES, A. Comparative clinical trial of the progestins R-2323 and levonorgestrel administered by subdermal implants. Contraception 18(2): 151-162. August 1978.

13. ALVAREZ-SANCHEZ, F., FAUNDES, A., BRACHE, V., and LEON, P. Attainment and maintenance of azoospermia with combined monthly injections of depot medroxyprogesterone acetate and testosterone enanthate. Contraception 15(6): 635-648. June 1977.

14. ALZA CORPORATION. [Ectopic pregnancies in comparative trial of Progestasert and plastic T] Personal communication, July 1, 1982.

15. ALZA CORPORATION. The Progestasert: intrauterine progesterone contraceptive system: release rated 65 μg/day progesterone for one year. Palo Alto, California, Alza Corporation, 1976. 61 p.

16. AMATAYAKUL, K. The effects of Depo-Provera on carbohydrate lipids and vitamin metabolism. Journal of Steroid Biochemistry 11(1B): 475-481. July 1979.

17. AMATAYAKUL, K. Safety and hazards of injectables hormonal contraceptives. Singapore Journal of Obstetrics and Gynaecology 9: 57-59. 1979.

18. AMATAYAKUL, K., SIVASSOMBOON, B., and SINGKAMANI, R. Effects of medroxyprogesterone acetate on serum lipids, protein, glucose tolerance and liver function in Thai women. Contraception 21(3): 283-297. March 1980.

19. AMATAYAKUL, K., SIVASOMBOON, B., and THANANGKUL, O. A study of the mechanism of weight gain in medroxyprogesterone acetate users. Contraception 22(6): 605-622. December 1980.

20. AMERICAN ACADEMY OF PEDIATRICS. COMMITTEE ON DRUGS. Medroxyprogesterone acetate (Depo-Provera). Pediatrics 65(3): 648. March 1980.

*21. AMERICAN COLLEGE OF OBSTETRICIANS AND GYNECOLOGISTS. COMMITTEE ON GYNECOLOGIC PRACTICE. SUBCOMITTEE ON REPRODUCTIVE ENDOCRINOLOGY. Depot medroxyprogesterone acetate: use as a contraceptive. (Background position paper for use with the Food and Drug Administration.) Rev. ed. June 29, 1982. 21 p. (Unpublished)

22. ANDERSON, D.G. Management of advanced endometrial adenocarcinoma with medroxyprogesterone acetate. American Journal of Obstetrics and Gynecology 92(1): 87-99. May 1, 1965.

23. APELO, R.A., DE LA CRUZ, J.R. and CANCIO-LOPEZ, F. Acceptability of injectable contraception in the Philippines. IPPF Medical Bulletin 8(2): 1-2. April 1974.

24. ARCHARI, K. Effect of nor-ethisterone enanthate (SH 393) on the structure of the endometrium and on the cervical mucus. Journal of Obstetrics and Gynaecology of India 19(6): 731-736. 1969.

25. ARIWONGSE, B. Mobile family planning clinic, McCormick Hospital. In: McDaniel, E.B., ed. Second Asian Regional Workshop on Injectable Contraceptives, Chiang Mai, Thailand, 1981. Oklahoma City, Oklahoma, World Neighbors, October 1982. p. 54-55.

26. ARIWONGSE, B. Selection of new DMPA acceptors. In: McDaniel, E.B., ed. A report of the First Asian Regional Workshop on Injectable Contraceptives, Chiang Mai, Thailand, May 15-19, 1978. Chiang Mai, McCormick Hospital Family Planning Program, World Neighbors, International Planned Parenthood Federation, and Oxfam, 1978. p. 11-13.

27. ASTEDT, B., JEPPSSON, S., and PANDOLFI, M. Fibrinolytic activity of veins during use of depot medroxyprogesterone acetate as a contraceptive. Fertility and Sterility 23(7): 489-492. July 1972.

28. AZAMAR, A.R. Estudio comparativo de dos modernos métodos anticonceptivos: un inyectable mensual y la "T" de cobre. [A comparative study of two modern contraceptive methods: a monthly injectable and the Copper "T."] [SPA, summary in ENG] Medicina Revista Mexicana 56: 89-92. March 1976.

29. BABCOCK, J.C., GUTSELL, E.S., HERR, M.E., HOGG, J.A., STUCKI, J.C., BARNES, L.E., and DULIN, W.E. 6α-methyl-17α-hydroxyprogesterone 17-acylates: a new class of potent progestins. Journal of the American Chemical Society 80: 2902, 2905. 1958.

30. BADHAM, D. [United Nations Fund for Population Activities (UNFPA)] [UNFPA provision of injectables] Personal communication, November 30, 1982.

31. BADRAOUI, M.H.H., ASKALANI, H., MAHROUS, I., SEROUR, G., and HEFNAWI, F. Lactation pattern in Egyptian women using the Progestasert system. Contraceptive Delivery Systems 3(1): 53-60. January 1982.

32. BADRAOUI, M.H.H., FAWZI, G., and HEFNAWI, F. Effects of some progestational steroids on lactation. Journal of Biosocial Science (Suppl. 4): 135-148. 1977.

33. BAHEMUKA, M. Benign intracranial hypertension associated with the use of Depo-Provera (depot medroxyprogesterone): a case report. East African Medical Journal 58(2): 140-141. February 1981.

34. BAILEY, W. and POWELL, D. Patterns of contraceptive use in Kingston and St. Andrew Jamaica: 1970-1977. Social Science and Medicine 16(19): 1675-1683. 1982.

35. BAIN, J. Androgen-progestin combinations: clinical trials. In: Cunningham, G.R., Schill, W.B., and Hafez, E.S.E., eds. Regulation of male fertility. The Hague, Netherlands, Martinus Nijhoff, 1980. p. 85-91.

*36. BALDWIN, G.B. The McCormick Family Planning Program in Chiang Mai, Thailand. Studies in Family Planning 9(12): 300-312. December 1978.

37. BANGLADESH. MINISTRY OF HEALTH AND POPULATION CONTROL. POPULATION CONTROL AND FAMILY PLANNING DIVISION. MANAGEMENT INFORMATION SYSTEM UNIT. Bangladesh Contraceptive Prevalance Survey—1981: tables. Dacca, Ministry of Health and Population Control, December 1981. 103 p.

38. BARFIELD, A., MELO, J., COUTINHO, E., ALVAREZ-SANCHEZ, F., FAUNDES, A., BRACHE, V., LEON, P., FRICK, J., BARTSCH, G., WEISKE, W.H., BRENNER, P., MISHELL, D., Jr., BERNSTEIN, G., and ORTIZ, A. Pregnancies associated with sperm concentrations below 10 million/ml in clinical studies of a potential male contraceptive method, monthly depot medroxyprogesterone acetate and testosterone esters. Contraception 20(2): 121-127. August 1979.

39. BARTEN, J. Other data on Depo-Provera research. [Table] Presented at Symposium on Depo-Provera, Manila, Philippines, November 1978. 1 p.

40. BARTEN, J. Return of pregnancy after termination of DMPA. Indonesian Medical Association Newsletter, No. 31-32, August 1982. 5 p.

41. BASNAYAKE, S. A study of Depo Provera users in a family planning clinic in Sri Lanka. In: McDaniel, E.B., ed. A report of the First Asian Regional Workshop on Injectable Contraceptives, Chiang Mai Thailand, May 15-19, 1978. Chiang Mai, McCormick Hospital Family Planning Program, World Neighbors, International Planned Parenthood Federation, and Oxfam, 1978. p. 21-24.

42. BASNAYAKE, S. A study of 157 women who conceived after discontinuation of Depo Provera. [Colombo, Sri Lanka, Family Planning Association of Sri Lanka], October 1981. 9 p.

43. BECK, L.R. [University of Alabama] [Clinical trials with norethindrone biodegradable microspheres] Personal communication, January 21, 1983.

44. BECK, L.R., AZNAR RAMOS, R., FLOWERS, C.E., Jr., ZOMORA LOPEZ, G., LEWIS, D.H., and COWSAR, D.R. Clinical evaluation of injectable biodegradable contraceptive system. American Journal of Obstetrics and Gynecology 140(7): 799-806. August 1, 1981.

45. BECK, L.R., COWSAR, D.R., and POPE, V.Z. Injectable particulate contraceptive systems. In: Zatuchni, G.I., Labbok, M. H., and Sciarra, J.J., eds. Research frontiers in fertility regulation. Hagerstown, Maryland, Harper & Row, 1980. (PARFR Series on Fertility Regulation) p. 213-229.

*46. BECK, L.R., COWSAR, D.R., and POPE, V.Z. Long-acting steroidal contraceptive systems. Research Frontiers in Fertility Regulation 1(1): 1-16. July 1980.

47. BECK, P., ZIMMERMAN, D.E., and EATON, R.P. Effect of contraceptive steroids on arginine-stimulated glucagon and insulin secretion in women: 3. Medroxyprogesterone acetate. Metabolism 26(11): 1193-1198. November 1977.

48. BEIER, S., HAASE, F., KOSUB, B., DÜSTERBERG, B., and ELGER, W. The progestational activity of different gestagens used for human contraception in the beagle bitch. Contraception 20(6): 533-548. December 1979.

49. BENAGIANO, G. [University of Rome] [Manufacture of hormonal contraceptives] Personal communication, July 2, 1981.

50. BENAGIANO, G., ERMINI, M., and GABELNICK, H.L. Release of contraceptive progestogens from biodegradable systems. In: Molen, H.J. Van der, Klopper, A., Lunenfeld, B., Neves e Castro, M., Sciarra, F., and Vermeulen, A., eds. Hormonal factors in fertility, infertility and contraception: proceedings of the 10th Meeting of the International Study Group for Steroid Hormones, Rome, December 2-4, 1981. Amsterdam, Excerpta Medica, 1982. (Research on Steroids vol. 10; International Congress Series no. 580) p. 141-147.

51. BENAGIANO, G., FOTHERBY, K., COUTINHO, E., SOUZA, J.C. DE, HINGORANI, V., TAKKER, D., KOETSAWANG, S., and SRISUPANDIT, S. Return of ovarian function and endometrial morphology in women treated with norethisterone oenanthate: a pilot study. Fertility and Sterility 34(5): 456-460. November 1980.

52. BENAGIANO, G. and FRASER, I. The Depo-Provera debate: commentary on the article "Depo-Provera, a critical analysis." Contraception 24(5): 493-528. November 1981.

53. BENNETT, T. [Thailand Ministry of Public Health] [Local packaging of DMPA] Personal communication, February 1, 1983.

54. BERLINER, V.R. U.S. Food and Drug Administration requirements for toxicity testing of contraceptive products. Acta Endocrinologica 75(Suppl. 185): 240-265. 1974.

55. BERMAN, E. The once-a-month pill. Presented at a Symposium on Research and New Developments in Contraception (arranged by the Family Planning Centers of Greater Los Angeles and the Organizers of the Family Planning Association of the Americas), Las Vegas, Nevada, September 26-28, 1969. 20 p.

*56. BHATIA, S., MOSLEY, W.H., FARUQUE, A.S.G., and CHAKRABORTY, J. The Matlab Family Planning Health Services Project. Studies in Family Planning 11(6): 202-212. June 1980.

57. BLACK, H.R., LEPPERT, P., and DECHERNEY, A. The effect of medroxyprogesterone acetate on blood pressure. International Journal of Gynaecology and Obstetrics 17(1): 83-87. 1979.

58. BLACKSHEAR, P.J. Implantable drug-delivery systems. Scientific American 241(6): 66-73. December 1979.

59. BLOCH, B. Depot medroxyprogesterone acetate (Depo-Provera) as a contraceptive preparation. South African Medical Journal 45(28): 777-780. July 17, 1971.

60. BLOCH, B. and DAVIES, A.H. Evaluation of a combined oestrogen-progestogen injectable contraceptive. South African Medical Journal 53(21): 846-847. May 27, 1978.

61. BONTE, J. Endocrine factors, including antiovulatory steroids, favoring breast disease. In: Castelazo-Ayala, L., MacGregor, C., Ebling, F.J.G., and Henderson, I.W., eds. Gynecology and obstetrics: proceedings of the 8th World Congress of Gynecology and Obstetrics, Mexico City, October 17-22, 1977. Amsterdam, Excerpta Medica, 1977. p. 139-154.

62. BONTE, J. Medroxyprogesterone in the management of primary and recurrent or metastatic uterine adenocarcinoma. Acta Obstetricia et Gynecologica Scandinavica (Suppl. 19): 21-24. 1972.

63. BONTE, J., DECOSTER, J.M., IDE, P., and BILLIET, G. Hormonoprophylaxis and hormonotherapy in the treatment of endometrial adenocarcinoma by means of medroxyprogesterone acetate. Gynecologic Oncology 6(1): 60-75. February 1978.

64. BRAKMAN, P., SOBRERO, A.J., and ASTRUP, T. Effects of different systemic contraceptives on blood fibrinolysis. American Journal of Obstetrics and Gynecology 106(2): 187-192. January 1970.

65. BRAT, T.M. Acceptability of Depo-Provera as a reliable contraceptive method. [Abstract] In: Kleinman, R. and Pickles, V. R. eds. Seventh World Congress on Fertility and Sterility, Kyoto, Japan, October 17-25, 1971. Amsterdam, Excerpta Medica, 1971. (International Congress Series No. 234a) p. 85.

66. BREMNER, W.J. and KRETSER, D.M. DE. The prospects for new, reversible male contraceptives. New England Journal of Medicine 295(20): 1111-1117. November 11, 1976.

67. BRENNER, P.F. [Testimony] In: United States. Food and Drug Administration. Proceedings of the Depo-Provera Public Board of Inquiry, [Washington, D.C.], January 13, 1983. Vol. 4. Arlington, Virginia, TIW Reporting Group, 1983. p. 137-143.

68. BRENNER, P.F. and MISHELL, D.R., Jr. Newer developments in steroidal contraceptives: injectables, subcutaneous implants, intravaginal rings. In: Moghissi, K. S., ed. Controversies in contraception. Baltimore, Williams and Wilkins, 1979. p. 202-220.

69. BRENNER, P.F., MISHELL, D.R., Jr., STANCZYK, F.Z., and GOEBELSMANN, U. Serum levels of d-norgestrel, luteinizing hormone, follicle-stimulating hormone, estradiol, and progesterone in women during and following ingestion of combination oral contraceptives containing dl-norgestrel. American Journal of Obstetrics and Gynecology 129(2): 133-140. September 15, 1977.

70. BRIGGS, M. The beagle dog and contraceptive steroids. Life Sciences 21(3): 275-284. August 1, 1977.

71. BRIGGS, M.H. Progestogens and mammary tumours in the beagle bitch. Research in Veterinary Science 28(2): 199-202. March 1980.

72. BRUCKNER, H.W. and DEPPE, G. Combination chemotherapy of advanced endometrial adenocarcinoma with Adriamycin, cyclophosphamide, 5-fluorouracil, and medroxyprogesterone acetate. Obstetrics and Gynecology 50(1, Suppl.): 10s-12s. July 1977.

73. BUCKINGHAM, M.S., EVERITT, J., and ELSTEIN, M. An inert intracervical contraceptive device: a preliminary clinical trial. In: Insler, V. and Bettendorf, G., eds. The uterine cervix in reproduction: workshop conference, Rottach-Egern, West Germany, 1977, sponsored by Organon. Stuttgart, West Germany, Georg Thieme, 1977. p. 277-281.

74. BUDOFF, P.W. and SOMMERS, S.C. Estrogen-progesterone therapy in premenopausal women. Journal of Reproductive Medicine 22(5): 241-247. May 1979.

75. BUR, G.E., GONZALEZ-PENA, J.C., LUCHETA, M., and ANTELO, L. Cambios histopatológicos de las trompas de Falopio durante el tratamiento con enantato de noretisterona. [Histopathological changes of the fallopian tubes during treatment with

norethisterone enanthate.] [SPA] Obstetricia y Ginecologia Latino-Americanas 26(11/12): 494-497. November 1970.

76. BURN, R.V. [International Planned Parenthood Federation (IPPF)] [IPPF provision of injectable contraceptives] Personal communication, September 24 1982.

77. BURSTEIN, R. and WASSERMAN, H.C. The effect of Provera on the fetus. Obstetrics and Gynecology 23(6): 931-935. June 1964.

78. BURTON, F.G., SKIENS, W.E., and DUNCAN, G.W. Low-level, progestogen-releasing vaginal contraceptive devices. Contraception 19(5): 507-516. May 1979.

79. CAMANNI, F., MASSARA, F., and MOLINATTI, G.M. The cortisone-like effect of 6α-methyl-17α-acetoxyprogeste;one in the adrenalectomized man. Acta Endocrinologica 43: 477-483. 1963.

80. CAMERON, A.M. and FAULKIN, L.J., Jr. Hyperplastic and inflammatory nodules in the canine mammary gland. Journal of the National Cancer Institute 47(1): 1277-1283. July 1971.

81. CAMPBELL, F.E. [Testimony] In: United States. Food and Drug Administration. Proceedings of the Depo-Provera Public Board of Inquiry, [Washington, D.C.], January 14, 1963. Vol. 5. Arlington, Virginia, TIW Reporting Group, 1983. p. 84-95.

82. CAPEL-EDWARDS, K., HALL, D.E., FELLOWES, K.P., and VALLANCE, D.K. Long-term administration of progesterone to the female beagle dog. Toxicology and Applied Pharmacology 24: 474-488. 1973.

83. CARLSON, A. [The Upjohn Company] [Malignant mammary tumors in Dawson study beagle dogs] Personal communication, February 25, 1983.

•84. CARRASCO, E. Contraceptive practice. Voorburg, Netherlands, International Statistical Institute, June 1981. (World Fertility Survey Comparative Studies: Cross National Summaries No. 9) 75 p.

85. CASTAÑEDA LEAL, A. and RIOS CASTRO, B. Clinical study of medroxyprogesterone in family planning programs. [ENG, SPA] In: Sanhueza, H. and Jaimes, R., eds. Contraceptive progress in Latin America and the Caribbean: proceedings of the IPPF/WHR 2nd Regional Medical Seminar, Medellin, Colombia, November 25-26, 1975. New York, International Planned Parenthood Federation (IPPF), 1976. p. 8-16.

86. CASTLE, W.M., SAPIRE, K.E., and HOWARD, K.A. Efficacy and acceptability of injectable medroxyprogesterone: a comparison of 3-monthly and 6-monthly regimens. South African Medical Journal 53(21): 842-845. May 27, 1978.

87. CEULAER, K., GRUBER, C., HAYES, R., and SERJEANT, G.R. Medroxyprogesterone acetate and homozygous sickle-cell disease. Lancet 2(8292): 229-231. July 31, 1982.

88. CHEN, P.-C. Birth planning. In: Committee on Scholarly Communication with the People's Republic of China. Rural health in the People's Republic of China. Washington, D.C., U.S. Government Printing Office, 1980. (NIH Publ. No. 81-2124) p. 105-127.

89. CHINNATAMBY, S. A comparison of the long-acting contraceptive agents norethisterone oenanthate and medroxyprogesterone acetate. Australian and New Zealand Journal of Obstetrics and Gynaecology 11(4): 233-236. November 1971.

90. CHUMNIJARAKIJ, T., GROSSMAN, R.A., OPTHUAM, Y., MUTTAMARA, S., and CHARUMILIND, P. A study of contraceptive choice and use in Bangkok metropolis health clinics. Contraception 24(3): 245-258. September 1981.

91. CLIQUET, R.L., BOGAERT, G. VAN DEN, and BECUE, B. Knowledge, use and effectiveness of contraception in Belgium. In: Moors, H.G., Cliquet, R.L., Dooghe, G., and Kaa, D.J. Van de, eds. Population and family in the Low Countries. Vol. 1. Leiden, Netherlands, Martinus Nijhoff, 1976. p. 55-71.

92. CLIQUET, R.L., HYFTE, E. VAN, and DEVEN, F. Evolutie van de kennis en van het gebruik van anticonceptionele methoden bij de gehuwde vrouwen van de Nederlandse cultuurgemeenschap in Belgie, 1966-1976: eerste resultaten van NEGO-III. [Evolution of the knowledge about the use of contraceptive methods among married women in the Dutch-speaking community of Belgium, 1966-1976: preliminary results of NEGO-III.] [DUT, summary in ENG] Bevolking en Gezin, No. 3, 1976. p. 245-269.

93. COHEN, M.R., PANDYA, G.N., and SCOMMEGNA, A. The effects of an intracervical steroid-releasing device on the cervical mucus. Fertility and Sterility 21(10): 715-723. October 1970.

94. COREA, G. Depo-Provera weapon. In: Holmes, H.B., Hoskins, B.B., and Gross, M., eds. Birth control and controlling birth: women-centered perspectives. Clifton, New Jersey, Humana Press, 1980. p. 107-139.

95. CORREU, S. Postpartum and postabortal use of injectable contraceptives. In: Holtrop, H.R., Waife, R.S., Bustamante, W., and Rizo, A., eds. New Developments in Fertility Regulation: a Conference for Latin American Physicians, Airlie, Virginia, March 28-30, 1976. Chestnut Hill, Massachusetts. Pathfinder Fund. 1976. p. 188-192.

•96. CORREU AZCONA, S. FEPAC's experience with injectables administered every 3 months. In: Sanhueza, H. and Jaimes, R., eds. Contraceptive progress in Latin America and the Caribbean: proceedings of the IPPF/WHR 2nd Regional Medical Seminar, Medellin, Colombia, November 25-26, 1975. New York, International Planned Parenthood Federation (IPPF), 1976. p. 3-7.

•97. COUTINHO, E. Clinical experience with implant contraception. Contraception 18(4): 411-427. October 1978.

98. COUTINHO, E.M. [Maternidade Climerio de Oliveira, Federal University of Bahia, Salvador, Brazil] [Research in contraceptive implants containing progestin ST-1435] Personal communication, September 10, 1982.

99. COUTINHO, E.M., MATTOS, C.E.R., SANT'ANNA, A.R.S., FILHO, J.A., SILVA, M.C., and TATUM, H.J. Further studies on long-term contraception by subcutaneous Silastic capsules containing megestrol acetate. Contraception 5(5): 389-393. May 1972.

100. COUTINHO, E.M., MATTOS, C.E.R., SANT'ANNA, A.R.S., FILHO, J.A., SILVA, M.C., and TATUM, H.J. Longterm contraception by subcutaneous Silastic capsules containing megestrol acetate. Contraception 2(5): 313-321. November 1970.

101. COUTINHO, E.M. and SILVA, A.R. DA. One-year contraception with norgestrienone subdermal silastic implants. Fertility and Sterility 25(2): 170-176. February 1974.

102. COUTINHO, E.M., SILVA, A.R. DA, CARREIRA, C.M., CHAVES, M.C., and FILHO, J.A. Contraceptive effectiveness of silastic implants containing the progestin R-2323. Contraception 11(6): 625-635. June 1975.

103. COUTINHO, E.M., SILVA, A.R. DA, CARREIRA, C.M.V., and SIVIN, I. Long-term contraception with a single implant of the progestin ST-1435. Fertility and Sterility 36(6): 737-740. December 1981.

104. COUTINHO, E.M., SILVA, A.R. DA, and KRAFT, H.-G. Fertility control with sub-dermal silastic capsules containing a new progestin (ST-1435). International Journal of Fertility 21(2): 103-108. 1976.

105. COUTINHO, E.M. and SOUZA, J.C. DE. Conception control by monthly injections of medroxyprogesterone suspension and a long-acting oestrogen. Journal of Reproduction and Fertility 15(2): 209-214. March 1968.

106. COUTINHO, E.M., SOUZA, J.C. DE, BARBOSA, I.C., and DOURADO SILVA, V. Long-lasting ovulation inhibition with a new injectable progestagen ORG-2154. Contraception 25(6): 551-560. June 1982.

107. CREASY, R.K., HILLIG, J.E., and MORRIS, J.A. Physiologic control of conception with an intramuscular progestogen-estrogen: clinical experience. Contraception 1(4): 271-278. April 1970.

108. CROUT, J.R. Upjohn Co.; Depo-Provera sterile aqueous suspension. Federal Register 43(127): 28555-28556. June 30, 1978.

109. CROXATTO, H.B. [Consultorio de Planificación Familiar, Santiago, Chile] [Clinical chemistry in women treated with levonorgestrel implants or a TCu 200 IUD] Personal communication, November 22, 1982.

110. CROXATTO, H.B. and DIAZ, S. Steroidal implants for contraception. In: Ebling, F.J.G. and Henderson, I.W., eds. Biological and clinical aspects of reproduction: Selected, updated papers presented at the 8th World Congress of Fertility and Sterility, Buenos Aires, November 3-9, 1974. Amsterdam, Excerpta Medica, 1976. p. 386-389.

111. CROXATTO, H.B., DIAZ, S., and MIRANDA, P. Plasma levels of levonorgestrel in women during longterm use of Norplants. Contraception 22(6): 583-596. December 1980.

112. CROXATTO, H.B., DIAZ, S., and PAVEZ, M. Clinical chemistry in women treated with progestogen implants. Contraception 18(4): 441-450. October 1978.

113. CROXATTO, H.B., DIAZ, S., PAVEZ, M., MIRANDA, P., and BRANDEIS, A. Plasma progesterone levels during long-term treatment with levonorgestrel silastic implants. Acta Endocrinologica 101(2): 307-311. October 1982.

114. CROXATTO, H.B., DIAZ, S., QUINTEROS, E., SIMONETI, L., KAPLAN, E., RENCORET, R., LEIXELARD, P., and MARTINEZ, C. Clinical assessment of subdermal implants of megestrol acetate, d-norgestrel, and norethindrone as a longterm contraceptive in women. Contraception 12(6): 615-627. December 1975.

115. CROXATTO, H., DIAZ, S [illegible]ERA, R., ETCHART, M., and ATRIA, P. Fertility control in women with a progestogen released in microquantities from subcutaneous capsules. American Journal of Obstetrics and Gynecology 105(7): 1135-1138. December 1, 1969.

116. CROXATTO, H.-D., DIAZ, S., ROSATI, S., and CROXATTO, H.B. Adnexal complications in women under treatment with progestogen implants. Contraception 12(6): 629-637. December 1975.

117. CURTIS, B. [World Neighbors] [Information on long-acting steroidal contraceptives] Personal communication, September 13, 1982.

118. CUSHING, J. [Westinghouse Health Systems] [Table on use of contraceptive injectables] Personal communication, November 8, 1982.

119. DAHLBERG, K. Some effects of depo-medroxyprogesterone acetate (DMPA): observations in the nursing infant and in the long-term user. International Journal of Gynaecology and Obstetrics 20(1): 43-48. February 1982.

120. DALLENBACK-HELLWEG, G. [Testimony] In: United States. Food and Drug Administration. Proceedings of the Depo-Provera Public Board of Inquiry, [Washington, D.C.], January 11, 1983. Vol. 2. Arlington, Virginia, TIW Reporting Group, 1983. p. 142-161.

121. DAVIS, M.E. and WIED, G.L. Long-acting progestational agents. Geburtshilfe und Frauenheilkunde 17(10): 916-928. 1957.

122. DHALL, K., DASH, R.J., CHADHA, U., RASTOGI, G.K., and DEVI, P.K. Effect of three injections of norethisterone oenanthate on ovarian function. Indian Journal of Medical Research 69(1): 93-98. January 1979.

123. DHALL, K., KUMAR, M., RASTOGI, G.K., and DEVI, P.K. Short-term effects of norethisterone oenanthate and medroxyprogesterone acetate on glucose, insulin, growth hormone, and lipids. Fertility and Sterility 28(2): 156-158. February 1977.

•124. DIAZ, S., PAVEZ, M., MIRANDA, P., ROBERTSON, D.N., SIVIN, I., and CROXATTO, H.B. A five-year clinical trial of levonorgestrel silastic implants (Norplant). Contraception 25(5): 447-456. May 1982.

125. DIAZ, S., PAVEZ, M., QUINTEROS, E., DIAZ, J., ROBERTSON, D.N., and CROXATTO, H.B. Clinical trial with subdermal implants containing norgestrienone. Contraception 18(4): 429-440. October 1978.

126. DIAZ, S., PAVEZ, M., ROBERTSON, D.N., and CROXATTO, H.B. A three-year clinical trial with levonorgestrel silastic implants. Contraception 19(6): 557-573. June 1979.

•127. DICZFALUSY, E., FRASER, I.S., and WEBB, F.T.G., eds. Endometrial bleeding and steroidal contraception: proceedings of a Symposium on Steroid Contraception and Mechanisms of Endometrial Bleeding organized by the World Health Organization in Geneva on 12-14 September 1979. Bath, England, Pitman, 1980. 440 p.

•128. DICZFALUSY, E. and LANDGREN, B.-M. New delivery systems: vaginal devices. In: Chang, C.F., Griffin, D., and Woolman, A., eds. Recent advances in fertility regulation: proceedings of a Symposium organized by the Ministry of Public Health of the People's Republic of China, and the World Health Organization's Special Programme of Research, Development and Research Training in Human Reproduction, Beijing, September 2-5, 1980. Geneva, Atar, 1981. p. 43-69.

129. DODDS, G. Depoprovera, a report on the clinical findings and two year follow up of 1,883 women treated by 3 monthly injections of Depoprovera. In: Hudono, S.T., ed. Proceedings of the Fifth Asian Congress of Obstetrics and Gynaecology, Jakarta, Indonesia, October 8-15, 1971. Jakarta, Fifth Asian Congress of Obstetrics and Gynaecology, 1971. p. 169-175.

130. DODDS, G.H. The use of sterile medroxyprogesterone acetate suspension as a contraceptive during a three-year period. Contraception 11(1): 15-23. January 1975.

131. DONDE, U.M. and VIRKAR, K.D. Biochemical studies with once-a-month contraceptive pill containing quinestrol-quingestanol acetate. Contraception 11(6): 681-688. June 1975.

132. DUFFY, M.J. Estradiol and progesterone receptors in human breast tumours. Journal of the Irish Medical Association 73(8): 311-312. August 1980.

133. DUNCAN, G.W. [The Upjohn Company] [Depo-Provera approval in France; other sources of finished DMPA products] Personal communication, July 22, 1982. 1 p.

134. DUNCAN, G.W. [The Upjohn Company] [International impact of the controversy about Depo-Provera] Personal communication, April 10, 1981.

•135. DUNCAN, G.W., BURTON, F.G., and SKIENS, W.E. Vaginal, cervical, and subdermal delivery systems. In: Hafez, E.S.E., ed. Human reproduction: conception and contraception. 2nd ed. Hagerstown, Maryland, Harper & Row, 1980. p. 698-714.

136. DUSITSIN, N., CHALAPATI, S., VARAKAMIN, S., BOONSIRI, B., NINGSANON, P., and GRAY, R.H. Post-partum tubal ligation by nurse-midwives and doctors in Thailand. Lancet 1(8169): 638-639. March 22, 1980.

137. DUSITSIN, N., TANKEYOON, M., and LARSSON-COHN, U. Liver function in Thai women using different types of hormonal contraceptive agents. Journal of the Medical Association of Thailand 61(7): 381-389. July 1978.

138. DWYER, L. [Intercontinental Medical Statistics International] [Pharmacy purchases of Depo-Provera] Personal communication, December 2, 1982. 8 p.

139. DZIUK, P.J. and COOK, B. Passage of steroids through silicone rubber. Endocrinology 78(1): 208-211. January 1966.

140. EDUARDS, K. [Swedish International Development Authority (SIDA)] [Information on SIDA distribution of Depo Provera] Personal communication, June 19, 1981. 3 p.

141. ELLIS, H.L. [Ellis Pharmaceutical Consulting, Inc.] [Distribution and testing of Noristerat] Personal communication, October 7, 1982.

142. ESCHENBACH, D.A. and SODERSTROM, R.M. IUDs and salpingitis. In: Hafez, E.S.E and Os, W.A.A. Van, eds. IUD pathology and management. Boston, G.K. Hall, 1980. (Progress in Contraceptive Delivery Systems Vol. 3) p. 147-158.

•143. ETREBY, M.F. EL, GRÄF, K.-J., BEIER, S., ELGER, W., GÜNZEL, P., and NEUMANN, F. Suitability of the beagle dog as a test model for the tumorigenic potential of contraceptive steroids: a short review. Contraception 20(3): 237-256. September 1979.

•144. FAN, H.M. Studies on long-acting oral contraceptives. In: Chang, C.F., Griffin, D., and Woolman, A., eds. Recent advances in fertility regulation: proceedings of a Symposium organized by the Ministry of Public Health of the People's Republic of China, and the World Health Organization's Special Programme of Research, Development and Research Training in Human Reproduction, Beijing, September 2-5, 1980. Geneva, Atar, 1981. p. 378-393.

•145. FAUNDES, A. Contraceptive implants: state of the art and prospects for the future. (Background paper for the International Symposium: Research on the Regulation of Human Fertility, Needs of Developing Countries and Priorities for the Future, Stockholm, Sweden, February 7-9, 1983). 32 p.

146. FAUNDES, A., HARDY, E., REYES, Q., PASTENE, L., and PORTES-CARRASCO, R. Acceptability of the contraceptive vaginal ring by rural and urban population in two Latin American countries. Contraception 24(4): 393-414. October 1981.

147. FAUNDES, A., MEJIAS, V.B. DE, LEON, P., ROBERTSON, D., and ALVAREZ, F. First year clinical experience with six levonorgestrel rods as subdermal contraception. Contraception 20(2): 167-175. August 1979.

148. FAUNDES, A., SIVIN, I., and STERN, J. Long acting contraceptive implants: an analysis of menstrual bleeding patterns. Contraception 18(4): 355-365. October 1978.

149. FINE, S.D. Patient labeling of medroxyprogesterone acetate injectable contraceptive: stay of effective date of final order. Federal Register 39(210): 38226-38227. October 30, 1974.

150. FINKEL, M.J. and BERLINER, V.R. The extrapolation of experimental findings (animal to man): the dilemma of the systemically administered contraceptives. Bulletin of the Society of Pharmacological and Environmental Pathologists, No. 4, December 1973. p. 13-18.

151. FOLKMAN, J. and LONG, D.M. The use of silicone rubber as a carrier for prolonged drug therapy. Journal of Surgical Research 4(3): 139-142. March 1964.

•152. FOTHERBY, K. Factors affecting the duration of action of the injectable contraceptive norethisterone enanthate. Contraceptive Delivery Systems 2(3): 249-257. July 1981.

153. FOTHERBY, K., BENAGIANO, G., TOPPOZADA, H.K., ABDEL-RAHMAN, A., NAVAROLI, F., ARCE, B., RAMOS-CORDERO, R., GUAL, C., LANDGREN, B.-M., and JOHANNISSON, E. A preliminary pharmacological trial of the monthly injectable contraceptive CycloProvera. Contraception 25(3): 261-272. March 1982.

154. FOTHERBY, K., HOWARD, G., SHRIMANKER, K., ELDER, M., and BYE, P.G.T. Occurrence of ovulation in women receiv-

ing the injectable contraceptive norethisterone oenanthate. Contraception 18(5): 535-542. November 1978.

155. FOTHERBY, K. and KOETSAWANG, S. Metabolism of injectable formulations of contraceptive steroids in obese and thin women. Contraception 26(1): 51-58. July 1982.

*156. FOTHERBY, K., KOETSAWANG, S., and MATHRUBUTHAM, M. Pharmacokinetic study of different doses of Depo Provera. Contraception 22(5): 527-536. November 1980.

*157. FOTHERBY, K., SAXENA, B.N., SHRIMANKER, K., HINGORANI, V., TAKKER, D., DICZFALUSY, E., AND LANDGREN, B.-M. A preliminary pharmacokinetic and pharmacodynamic evaluation of depot-medroxyprogesterone acetate and norethisterone oenanthate. Fertility and Sterility 34(2): 131-139. August 1980.

158. FOTHERBY, K., TRAYNER, I., HOWARD, G., HAMAWI, A., and ELDER, M.G. Effect of injectable norethisterone oenanthate (Norigest) on blood lipid levels. Contraception 25(4): 435-446. April 1982.

159. FOWLER, E.H., VAUGHAN, T., GOTCSIK, F., REICHHART, P., and REED, C. Pathologic changes in mammary glands and uteri from beagle bitches receiving low levels of medroxyprogesterone acetate: an overview of research in progress. In: Garattini, S. and Berendes, H.W., eds. Pharmacology of steroid contraceptive drugs. New York, Raven Press, 1977. p. 185-209.

160. FRANK, D.W., KIRTON, K.T., MURCHISON, T.E., QUINLAN, W.J., COLEMAN, M.E., GILBERTSON, T.J., FEENSTRA, E.S., and KIMBALL, F.A. Mammary tumors and serum hormones in the bitch treated with medroxyprogesterone acetate or progesterone for four years. Fertility and Sterility 31(3): 340-345. March 1979.

161. FRANK, P. Progestogens, lipoproteins and arterial disease: evidence from the Royal College of General Practitioners' Study. Presented at the Reproductive Health Care International Symposium, Maui, Hawaii, October 10-15, 1982. 13 p.

162. FRASER, I.S. [University of Sydney, Australia] [Current medical uses of Depo-Provera] Personal communication. January 12, 1983.

163. FRASER, I.S. Menstrual disturbance and injectable contraceptives. In: McDaniel, E.B., ed. Second Asian Regional Workshop on Injectable Contraceptives, Chiang Mai, Thailand, 1981. Oklahoma City, Oklahoma, World Neighbors, October 1982. p. 15-17.

*164. FRASER, I.S. and WEISBERG, E. A comprehensive review of injectable contraception with special emphasis on depot medroxyprogesterone acetate. Medical Journal of Australia 1(1, Special suppl.): 1-19. January 24, 1981.

165. FREE, M. [Program for the Introduction and Adaptation of Contraceptive Technology] [Quality control of locally induced injectables] Personal communication, February 25, 1983.

166. FRICK, J., BARTSCH, G., and WEISKE, W.-H. The effect of monthly depot medroxyprogesterone acetate and testosterone on human spermatogenesis: 1. Uniform dosage levels. Contraception 15(6): 649-668. June 1977.

167. FUNCKES, C.G., CHVAPIL, M., CARROL, R.W., and BRESSLER, R. Effect of a long-acting contraceptive drug, norethindrone enanthate, on serum zinc and copper in human volunteers. Contraception 14(3): 291-295. September 1976.

168. GABELNICK, H. [US National Institute of Child Health and Human Development] [Research on the CAPRONOR biodegradable implant system] Personal communication. November 29, 1982.

169. GAGNE, P. Treatment of sex offenders with medroxyprogesterone acetate. American Journal of Psychiatry 138(5): 644-646. May 1981.

170. GALLEGOS, A.J. Vaginal steroidal contraception. In: Zatuchni, G.I., Labbok, M.H., and Sciarra, J.J., eds. Research frontiers in fertility regulation. Hagerstown, Maryland, Harper & Row, 1980. (PARFR Series on Fertility Regulation) p. 230-246.

171. GAMBRELL, R.D., Jr., MASSEY, F.M., CASTANEDA, T.A., UGENAS, A.J., and RICCI, C.A. Reduced incidence of endometrial cancer among postmenopausal women treated with progestogens. Journal of the American Geriatrics Society 27(9): 389-394. 1979.

172. GARDNER, J.M. and MISHELL, D.R., Jr. Analysis of bleeding patterns and resumption of fertility following discontinuation of a long acting injectable contraceptive. Fertility and Sterility 21(4): 286-291. April 1970.

173. GEIL, R.G. and LAMAR, J.K. FDA studies of estrogen, progestogens,and estrogen/progestogen combinations in the dog and monkey. Journal of Toxicology and Environmental Health 3(1-2): 179-193. September 1977.

174. GIBOR, Y. and MITCHELL, C. Selected events following insertion of the Progestasert system. Contraception 21(5): 491-503. May 1980.

175. GIBOR, Y. and PHARRIS, B. Grossesse extra-utérine et D.I.U. [Extrauterine pregnancies and IUD use.] [FRE] Contraception Fertilité, Sexualité 8(2): 109-120. February 1980.

176. GIWA-OSAGIE, O.F. and NEWTON, J.R. Injectable norethisterone enanthate contraception: absence of an effect on oral glucose tolerance. Contraceptive Delivery Systems 3(1): 61-62. January 1982.

177. GIWA-OSAGIE, O.F., SAVAGE, J., and NEWTON, J.R. Norethisterone oenanthate as an injectable contraceptive: a study of patients discontinuing treatment. Contraception 18(5): 517-526. November 1978.

178. GIWA-OSAGIE, O.F., SAVAGE, J., and NEWTON, J.R. Norethisterone oenanthate as an injectable contraceptive: use of a modified dose schedule. British Medical Journal 1(6128): 1660-1662. June 24, 1978.

179. GLASS, R.H. and MORRIS, J.M. Antifertility effects of an intracervical progestational device. Biology of Reproduction 7: 160-165. 1972.

180. GOEBELSMANN, U. STANCZYK, F.Z., BRENNER, P.F., GOEBELSMANN, A.E., GENTZSCHEIN, E.K.E., and MISHELL, D.R., Jr. Serum norethindrone (NET) concentrations following intramuscular NET enanthate injection: effect upon serum LH, FSH, estradiol and progesterone. Contraception 19(3): 283-313. March 1979.

*181. GOLD, R.B. and WILLSON, P.D. Depo-Provera: new developments in a decad-old controversy. International Family Planning Perspectives 6(4): 156-160. December 1980.

182. GOLDMAN, J.A., OVADIA, J.L., and ECKERLING, B. Effect of progesterone on glucose tolerance in women. Israel Journal of Medical Sciences 4(4): 878-882. 1968.

*183. GOLDZIEHER, J.W. and BENAGIANO, G. Long-acting injectable steroid contraceptives. In: Mishell, D.R., Jr., ed. Advances in fertility research. Vol. 1. New York, Raven Press, 1982. p. 75-115.

184. GOLDZIEHER, J.W., KLEBER, J.W., MOSES, L.E., and RATHMACHER, R.P. A cross-sectional study of plasma FSH and LH levels in women using sequential, combination or injectable steroid contraceptives over long periods of time. Contraception 2(4): 225-248. October 1970.

185. GORDON, T., CASTELLI, W.P., HJORTLAND, M.C., KANNEL, W.B., and DAWBER, T.R. High density lipoprotein as a protective factor against coronary heart disease: the Framingham Study. American Journal of Medicine 62(5): 707-714. May 1977.

186. GRÄF, K.-J., ETREBY, M.F. EL, and NEUMANN, F. Contraceptive hormones: the problem of the induction of mammary gland nodules in beagle dogs given progestogens. In: Plaa, G.L. and Duncan, W.A.M., eds. Proceedings of the First International Congress on Toxicology. New York, Academic Press, 1978. p. 225-243.

*187. GRAY, R.H. Patterns of bleeding associated with the use of steroidal contraceptives. In: Diczfalusy, E., Fraser, I.S. and Webb, F.T.G., eds. Endometrial bleeding and steroidal contraception: proceedings of a Symposium on Steroid Contraception and Mechanisms of Endometrial Bleeding organized by the World Health Organization in Geneva on 12-14 September 1979. Bath, England, Pitman Press, 1980. p. 14-44.

*188. GRAY, R.H. [Testimony] In: United States. Food and Drug Administration. Proceedings of the Depo-Provera Public Board of Inquiry, [Washington, D.C.], January 12, 1983. Vol. 3. Arlington, Virginia, TIW Reporting Group, 1983. p. 85-94

189. GRAY, R.H. [Johns Hopkins University] [WHO case-control study on pelvic inflammatory disease] Personal communication, February 23, 1983.

190. GRAY, R.H., PARDTHAISONG, T., MCDANIEL, E.B., and DOYLE, P. The timing of the first injection of Depo Provera. [Letter] IPPF Medical Bulletin 9(5): 3-4. October 1975.

*191. GRAY, R.H., PARKER, R.A., and DIETHELM, P. Vaginal bleeding disturbances associated with the discontinuation of long-acting injectable contraceptives. British Journal of Obstetrics and Gynaecology 88(3): 317-321. March 1981.

192. GREENHILL, A.H. and GLASS, R.H. Histologic effects of intracervical chlormadinone impregnanted silastic devices in rabbits. Contraception 6(4): 287-294. October 1972.

193. GREENSPAN, A. Researcher explains status of Depo Provera. Contraceptive Technology Update 2(3): 35-36. March 1981.

*194. GREENSPAN, A.R., HATCHER, R.A., MOORE, M., ROSENBERG, M.J., and ORY, H.W. The association of depomedroxyprogesterone acetate and breast cancer. Contraception 21(6): 563-569. June 1980.

195. GRESSER, J.D., WISE, D.L., BECK, L.R., and HOWES, J.F. Biodegradable cylindrical implants for fertility regulation. In: Hafez, E.S.E and Os, W.A.A. Van, eds. Biodegradables and delivery systems for contraception. Boston, G.K. Hall, 1980. (Progress in Contraceptive Delivery Systems Vol. 1) p. 83-95.

196. GROSSMAN, R.A., ASAWASENA, W., CHALPATI, S., TAEWTONG, D., and TOVANABUTRA, S. Effects of the injectable contraceptive depot medroxyprogesterone acetate in Thai women with liver fluke infestation: final results. Bulletin of the World Health Organization 57(5): 829-837. 1979.

197. GUILLEBAUD, J. and BONNAR, J. Estimation and prediction of IUD-related increased duration and amount of menstrual blood loss. In: Hafez, E.S.E. and Os, W.A.A. Van eds. IUD pathology and management. Boston, G.K. Hall, 1980. (Progress in Contraceptive Delivery Systems Vol. 3) p. 75-92.

198. GUILOFF, E., IBARRA-POLO, A., ZAÑARTU, J., TOSCANINI, C., MISCHLER, T.W., and GOMEZ-ROGERS, C. Effect of contraception on lactation. American Journal of Obstetrics and Gynecology 118(1): 42-45. January 1, 1974.

199. GUTIERREZ, C. [Syntex Internacional S.A.] [Usage of injectables in Mexico] Personal communication, December 1982.

200. HABASHY, M.A. EL-, MISHELL, D.R., Jr., and MOYER, D.L. Effect of supplementary oral estrogen on long-acting injectable progestogen contraception. Obstetrics and Gynecology 35(1): 51-54. January 1970.

201. HACETTEPE INSTITUTE OF POPULATION STUDIES. Turkiye dogurganlik arastirmasi 1978: ilk rapor, cilt 2: tablolae. [Turkish fertility survey 1978: first report, vol. 2: statistical tables.] [TUR, ENG] Ankara, Turkish Historical Society Press, 1980. (World Fertility Survey) 442 p.

202. HALL, P. E. and HOLCK, S. E. Injectable contraception. World Health, May 1982, p. 2-4.

203. HAMMOND, C.B., JELOVSEK, F.R., LEE, K.L., CREASMAN, W.T., and PARKER, R.T. Effects of long-term estrogen replacement therapy: 2. Neoplasia. American Journal of Obstetrics and Gynecology 133(5): 537-547. March 1, 1979.

204. HARLAP, S., PRYWES, R., and DAVIES, A.M. Birth defects and oestrogens and progesterones in pregnancy. [Letter] Lancet 1(7908): 682-683. March 22, 1975.

205. HARNECKER, J., CRISOSTO, C., ONETTO, E., and MUNOZ, L. Depo-Provera as an injectable female contraceptive agent. In: Israel Academy of Sciences and Humanities. Selected papers on anti-fertility agents: reprinted from Proceedings of the Sixth World Congress on Fertility and Sterility, Tel Aviv, 1968. Jerusalem, Israel Academy of Sciences and Humanities, 1970. p. 27-32.

206. HEFNAWI, F., HAMZA, A., SHEIKHA, Z. EL-, SEROUR, G. and YACOUT, M. Menstrual pattern and blood loss with U-coil inert progesterone releasing devices. [Abstract] Contraceptive Delivery Systems 1(3): 247. July 1980.

207. HEIKKILÄ, M. and LUUKKAINEN, T. Duration of breastfeeding and development of children after insertion of a levonorgestrel-releasing intrauterine contraceptive device. Contraception 25(3): 279-292. March 1982.

208. HEIN, C.R. Family planning in Mauritius: a national survey. Studies in Family Planning 8(12): 316-320. December 1977.

209. HEINONEN, O.P., SLONE, D., MONSON, R.R., HOOK, E.B., and SHAPIRO, S. Cardiovascular birth defects and antenatal exposure to female sex hormones. New England Journal of Medicine 296(2): 67-70. January 13, 1977.

210. HILL, R., AVERKIN, E., BROWN, W., GAGNE, W.E., and SEGRE, E. Progestational potency of chlormadinone acetate in the immature beagle bitch: preliminary report. Contraception 2(6): 381-390. December 1970.

211. HILL, R. and DUMAS, K. The use of dogs for studies of toxicity of contraceptive hormones. Acta Endocrinologica 75(Suppl. 185): 74-89. 1974.

212. HIRVONEN, E., MÄLKÖNEN, M., and MANNINEN, V. Effects of different progestogens on liproteins during postmenopausal replacement therapy. New England Journal of Medicine 304(10): 560-563. March 5, 1981.

213. HOLCK, S. [World Health Organization] [Pathologists' review of monkey uterine tumors] Personal communication, March, 1983.

214. HOLMES, A. and HUTT, J. Depo Provera: cause of concern. A discussion paper. Cardiff, Wales, Labour Party Wales, June 1981. 12 p.

215. HONG KONG. CENSUS AND STATISTICS DEPARTMENT. Hong Kong by-census, 1976: contribution to the WFS. [Hong Kong, Census and Statistics Department, 1977]. p. 65-70.

216. HOOVER, R.N. Testimony of Robert Nolan Hoover. Submitted to US Food and Drug Administration Public Board of Inquiry on Depo-Provera, December 21, 1982. FDA Docket No. 78N-0124. 62 p.

217. HORNSBY, V.P.L. An experience in family planning in Nairobi. East African Medical Journal 49(10): 714-723. October 1972.

218. HOWARD, G., BLAIR, M., CHEN, J.K., FOTHERBY, K., MUGGERIDGE, J., ELDER, M.G., and BYE, P.G. A clinical trial of norethisterone oenanthate (Norigest) injected every two months. Contraception 25(4): 333-343. April 1982.

219. HOWARD, G., ELDER, M.G., and FOTHERBY, K. The use of norethisterone oenanthate, an injectable contraceptive, in patients at risk of venous thrombosis. In: Greenhalgh, R.M., ed. Hormones and vascular disease. London, Pitman Medical, 1981. p. 294-299.

220. HOWARD, G., MYATT, L., and ELDER, M.G. The effects of intramuscular norethisterone oenanthate used as a contraceptive on intravenous glucose tolerance and on blood coagulation factors 7 and 10. British Journal of Obstetrics and Gynaecology 84(8): 618-621. August 1977.

221. HUBER, D. Clinical discussion group recommendations. In: McDaniel, E.B., ed. A report of the First Asian Regional Workshop on Injectable Contraceptives, Chiang Mai, Thailand, May 15-19, 1978. Chiang Mai, McCormick Hospital Family Planning Program, World Neighbors, International Planned Parenthood Federation, and Oxfam, 1978. p. 35-38.

222. HUBER, D.G., KHAN, A.R., BROWN, K., MALAKAR, M., and WAIT, G. Oral and injectable contraceptives: effects on breast milk and child growth in Bangladesh. In: Zatuchni, G.I., Labbok, M.H., and Sciarra, J.J., eds. Research frontiers in fertility regulation. Hagerstown, Maryland, Harper & Row, 1980. (PARFR Series on Fertility Regulation) p. 127-135.

223. HUBER, D., RAHMAN, M., and CHAKRABORTY, J. Injectable contraceptives in six villages of Matlab Thana, Bangladesh: initial experience. [1977]. 8 p. (Unpublished)

224. HULKA, B.S., CHAMBLESS, L.E., KAUFMAN, D.G., FOWLER, W.C., Jr., and GREENBERG, B.G. Protection against endometrial carcinoma by combination-product oral contraceptives. Journal of the American Medical Association 247(4): 475-477. January 1982.

225. HÜMPEL, M., SCHULZE, P.E., and SPECK, U. A new principle of injectable depot contraceptives: 1. Drug selection and studies in monkeys. Contraception 19(4): 411-419. April 1979.

226. HUTTON, J.D. DMPA and the press in New Zealand. In: McDaniel, E.B., ed. Second Asian Regional Workshop on Injectable Contraceptives, Chiang Mai, Thailand, 1981. Oklahoma City, Oklahoma, World Neighbors, October 1982. p. 70-73.

227. INTERNATIONAL PLANNED PARENTHOOD FEDERATION (IPPF). INTERNATIONAL MEDICAL ADVISORY PANEL. Injectable contraception. IPPF Medical Bulletin 14(6): 1-3. December 1980.

*228. INTERNATIONAL PLANNED PARENTHOOD FEDERATION (IPPF). INTERNATIONAL MEDICAL ADVISORY PANEL. Injectable contraceptives: safe and effective. IPPF Medical Bulletin 16(6): 3-4. December 1982.

*229. INTERNATIONAL PLANNED PARENTHOOD FEDERATION (IPPF). INTERNATIONAL MEDICAL ADVISORY PANEL. Statement on injectable contraception. IPFF Medical Bulletin 16(6): 3-4. December 1982.

230. INTERNATIONAL PLANNED PARENTHOOD FEDERATION (IPPF). INTERNATIONAL MEDICAL ADVISORY PANEL. Statement on intrauterine devices. IPPF Medical Bulletin 15(6): 1-3. December 1981.

231. ISAACS, W.A., EFFIONG, C.E., and AYENI, O. Steroid treatment in the prevention of painful episodes in sickle-cell disease. Lancet 1(7750): 570-571. March 11, 1972.

232. ISAACS, W.A. and HAYHOE, F.G.J. Steroid hormones in sickel-cell disease. Nature 215(5106): 1139-1142. September 9, 1967.

233. ISLAM, M.M. Injectable contraceptive Noristerat. In: Bangladesh Fertility Research Programme (BFRP). Workshop on Injectable Contraceptive (Noristerat), Dacca, Bangladesh, April 25, 1980. [Dacca, BFRP, 1980]. p. 117-123.

234. ISRAEL ACADEMY OF SCIENCES AND HUMANITIES. Selected papers on anti-fertility agents: reprinted from Pro-

ceedings of the Sixth World Congress on Fertility and Sterility, Tel Aviv, 1968. Jerusalem, Israel Academy of Sciences and Humanities, 1970. 40 p.

235. JACKANIECZ, T.M. Levonorgestrel and estradiol release from an improved contraceptive vaginal ring. Contraception 24(4): 323-339. October 1981.

236. JEPPSSON, S. and JOHANSSON, E.D.B. Medroxyprogesterone acetate, estradiol, FSH and LH in peripheral blood after intramuscular administration of Depo-Provera to women. Contraception 14(4): 461-469. October 1976.

237. JEPPSSON, S., JOHANSSON, E.D.B., LJUNGBERG, O., and SJÖBERG, N.-O. Endometrial histology and circulating levels of medroxyprogesterone acetate (MPA), estradiol, FSH and LH in women with MPA induced amenorrhoea compared with women with secondary amenorrhoea. Acta Obstetricia et Gynecologica Scandinavica 56(1): 43-48. 1977.

238. JEYASEELAN, S., TAKKAR, D., BHUYAN, U.N., LAUMAS, K.R., and HINGORANI, V. Local tissue response to silastic implant containing norethindrone acetate in women. Contraception 15(1): 39-51. January 1977.

239. JIMENEZ, J.J. Long term follow up of children breastfed by mothers under different regimes of contraception, mechanical and hormonal: preliminary report. December 1981. 12 p. (Unpublished)

240. JIN, O.C. and SUN, L.Y. Medullary infarction—was it Depo Provera? Singapore Medical Journal 21(5): 717-719. October 1980.

241. JOHANSSON, E.D.B., LUUKKAINEN, T., VARTIAINEN, E., and VICTOR, A. The effect of Progestin R 2323 released from vaginal rings on ovarian function. Contraception 12(3): 299-307. September 1975.

242. JOHN, H.M. Use of Depo in a community health program in sourthern India. In: McDaniel, E.B., ed. Second Asian Regional Workshop on Injectable Contraceptives, Chiang Mai, Thailand, 1981. Oklahoma City, Oklahoma. World Neighbors, October 1982. p. 18-21.

243. JUNKMANN, K. Über protrahiert wirksame Gestagene. [On the prolonged action of gestagens.] [GER] Naunyn-Schmeidebergs Archiv für Experimentelle Pathologie und Pharmakologie 223: 244-253. 1954.

244. JUNKMANN, K. and WITZEL, H. Chemie and Pharmakologie von Steroidhormon-Estern. [Chemistry and pharmacology of steroidal hormone esters.] [GER] Zeitschrift für Vitamin, Hormon, und Fermentforschung 9: 97-143. 1958.

245. KAMNUANSILPA, P. and CHAMRATRITHIRONG, A. A new decade of fertility and family planning in Thailand: 1981 Contraceptive Prevalence Survey. Bangkok, Westinghouse Health Systems, 1982. 132 p.

246. KARIM, M., AMMAR, R., MAHGOUB, S. EL, GANZOURY, B. EL, FIKRI, F., and ABDOU, I. Injected progestogen and lactation. British Medical Journal 1(5742): 200-203. January 23, 1971.

247. KARIM, M. and MAHGOUB, S. EL. Conception control by cyclic injections of norethisterone enanthate and estradiol unducelate. American Journal of Obstetrics and Gynecology 110(5): 740-742. July 1, 1971.

248. KARIM, M. and MAHGOUB, S. EL-. Injectable steroids as a method of contraception. Ain Shams Medical Journal 21(5): 543-550. September 1970.

249. KARSTADT, B. The use of Depo-Provera injections on a 6-monthly basis. [Letter] South African Medical Journal 50(47): 1887. November 6, 1976.

250. KARSTADT, B. Injectable long-acting progestogens for contraception. South African Medical Journal 44(16): 480-481. April 18, 1970.

251. KAUFMAN, D.W., SHAPIRO, S., SLONE, D., ROSENBERG, L., MIETTINEN, O.S., STOLLEY, P.D., KNAPP, R.C., LEAVITT, T., Jr., WATRING, W.G., ROSENSHEIN, N.B., LEWIS, J.L., Jr., SCHOTTENFELD, D., and ENGLE, R.L., Jr. Decreased risk of endometrial cancer among oral-contraceptive users. New England Journal of Medicine 303(18): 1045-1047. October 30, 1980.

252. KAY, C.R. Progestogens and arterial disease: evidence from the Royal College of General Practitioners' study. American Journal of Obstetrics and Gynecology 142(6, Pt. 2): 762-765. March 15, 1982.

253. KEIFER, W.S., LEE, A.F., and SCOTT, J.C. A clinical evaluation of a monthly injection for conception control. Transaction of the Pacific Coast Obstetrical and Gynecological Society 37: 94-104. 1970.

254. KELLY, B.M. [UK Overseas Development Administration] [Table on DMPA] Personal communication, August 19, 1981.

255. KELLY, B.M. [UK Overseas Development Administration (UK ODA)] [UK ODA policy on provision of Depo-Provera] Personal communication, July 9, 1981.

256. KENNEDY, D. [Statement on DMPA, August 8, 1978]. In: United States. Ninety-fifth Congress. House of Representatives. Select Committee on Population. The Depo-Provera debate: hearings. August 8-10, 1978. Washington, D.C., U.S. Government Printing Office, 1978. p. 302-314.

257. KENYA. CENTRAL BUREAU OF STATISTICS. MINISTRY OF ECONOMIC PLANNING AND DEVELOPMENT. Kenya fertility survey, 1977-1978: first report: Vol. 2. [Tables] Nairobi, Central Bureau of Statistics, Ministry of Economic Planning and Development, February 1980. (World Fertility Survey) 757 p.

258. KESSERU-KOOS, E., LARRANAGA-LEGUIA, A., HURTADO-KOOS, H., and SCHARFF, H.-J. Fertility control with norethindrone enanthate, a long-acting parenteral progestogen. Acta Europaea Fertilitatis 4(4): 203-221. December 1973.

259. KHALEQUE, S.A. Effects of Noristerat on liver function tests of Bangladeshi women. In: Bangladesh Fertility Research Programme (BFRP). Workshop on Injectable Contraceptive (Noristerat), Dacca, Bangladesh, April 25, 1980. [Dacca, BFRP, 1980]. p. 40-60.

260. KHAN, T., KAZI, A., and RAZU, B. Depo-Provera as long acting injectable contraceptive. In: Proceedings of the Seventh Biannual Seminar on Research in Population Planning, Karachi, April 12-14, 1973. Karachi, Pakistan National Research Institute of Fertility Control, [1973]. p. 97-103.

261. KHANOM, F. Injectable hormonal contraceptive in Mohammadpur Fertility Services and Training Centre. In: Bangladesh Fertility Research Programme (BFRP). Workshop on Injectable Contraceptive (Noristerat), Dacca, Bangladesh, April 25, 1980. [Dacca, BFRP, 1980]. p. 113-116.

262. KIRKWOOD, B.J., FACER, W.A.P., LAWRENCE, G.M., and HUNTON, R.B. Contraceptive practice among New Zealand women. New Zealand Medical Journal 89(641): 108-111. August 8, 1979.

263. KIRTON, K.T. and CORNETTE, J.C. Return of ovulatory cyclicity following an intramuscular injection of medroxyprogesterone acetate (Provera). Contraception 10(1): 39-45. July 1974.

264. KLAASSEN, D.J., RAPP, E.F., and HIRTE, W.E. Response to medroxyprogesterone acetate (NSC-26386) as secondary hormone therapy for metastatic breast cancer in postmenopausal women. Cancer Treatment Reports 60(3): 251-252. March 1976.

265. KOETSAWANG, S. Injected long-acting medroxyprogesterone acetate: effect on human lactation and concentrations in milk. Journal of the Medical Association of Thailand 60(2): 57-60. February 1977.

*266. KOETSAWANG, S. Present management of abnormal bleeding associated with steroidal contraceptives. In: Diczfalusy, E., Fraser, I.S., and Webb, F.T.G., eds. Endometrial bleeding and steroidal contraception: proceedings of a Symposium on Steroid Contraception and Mechanisms of Endometrial Bleeding organized by the World Health Organization in Geneva on 12-14 September 1979. Bath, England, Pitman Press, 1980. p. 50-58.

267. KOETSAWANG, S., BHIRALEUS, P., and CHIEMPRAJERT, T. Effects of oral contraceptives on lactation. Fertility and Sterility 23(1): 24-28. January 1972.

*268. KOETSAWANG, S., NUKULKARN, P., FOTHERBY, K., SHRIMANKER, K., MANGALAM, M., and TOWOBOLA, K. Transfer of contraceptive steroids in milk of women using long-acting gestagens. Contraception 25(4): 321-331. April 1982.

269. KOETSAWANG, S., SHRIMANKER, K., and FOTHERBY, K. Blood levels of medroxyprogesterone acetate after multiple injections of Depo Provera or Cyclo Provera. Contraception 20(1): 1-4. July 1979.

270. KOETSAWANG, S., SRISUPANDIT, S., KIRIWAT, O., and KOETSAWANG, A. The monthly injectable contraceptive: a two-year clinical trial. International Journal of Gynaecology and Obstetrics 16(1): 61-64. July-August 1978.

271. KOETSAWANG, S., SRISUPANDIT, S., SRIVANABOON, S., BHIRALEUS, P., RACHAWAT, D., KIRIWAT, O., and KOETSAWANG, A. Intramuscular depomedroxyprogesterone acetate for contraception. Journal of the Medical Association of Thailand 57(8): 396-408. August 1974.

272. KREAGER, P. Family planning drop-outs reconsidered: a critical review of research and research findings. London, International Planned Parenthood Federation, November 1977. (Research for Action No. 3) 162 p.

273. KREMER, J., BRUIJN, H.W.A. DE, and HINDRIKS, F.R. Serum high density lipoprotein cholesterol levels in women using a contraceptive injection of depot-medroxyprogesterone acetate. Contraception 22(4): 359-367. October 1980.

***274. KRETSER, D.M. DE. Fertility regulation in the male: recent developments. In: Chang, C.F., Griffin, D., and Woolman, A., eds. Recent advances in fertility regulation: proceedings of a Symposium organized by the Ministry of Public Health of the People's Republic of China, and the World Health Organization's Special Programme of Research, Development and Research Training in Human Reproduction, Beijing, September 2-5, 1980. Geneva, Atar, 1981. p. 112-121.**

275. KURREK, H. Depot-ovulationshemmer. [Depot ovulation inhibitors.] [GER] Therapeutische Umschau/Revue Thérapeutique 29: 307-309. May 1972.

276. KURUNMÄKI, H., TOIVONEN, J., LÄHTEENMÄKI, P., and LUUKKAINEN, T. Intracervical release of levonorgestrel for contraception. Contraception 23(5): 473-485. May 1981.

277. LÄHTEENMÄKI, P., WEINER, E., LÄHTEENMÄKI, P., JOHANSSON, E., and LUUKKAINEN, T. Contraception with subcutaneous capsules containing ST-1435: pituitary and ovarian function and plasma levels of ST-1435. Contraception 23(1): 63-75. January 1981.

278. LANDGREN, B.-M., JOHANNISSON, E., MASIRONI, B., and DICZFALUSY, E. Pharmacokinetic and pharmacodynamic effects of small doses of norethisterone released from vaginal rings continuously during 90 days. Contraception 19(3): 253-271. March 1979.

279. LANDGREN, B.-M., JOHANNISSON, E., MASIRONI, B., and DICZFALUSY, E. Pharmacokinetic and pharmacodynamic investigations with vaginal devices releasing levonorgestrel at a constant, near zero order rate. Contraception 26(6): 567-585. December 1982.

*280. LAROSA, J.C. Testimony of John C. LaRosa submitted to the U.S. Food and Drug Administration Public Board of Inquiry on Depo-Provera, December 9, 1982. FDA Docket No. 78 N-0124. 25 p.

281. LARRANAGA LEGUIA, A. A Latin American field trial with a once-a-month oral contraceptive. Journal of Reproductive Medicine 10(4): 202-203. April 1973.

282. LARSEN, S., HANSEN, M.K., JACOBSEN, J.C., LADEHOFF, P., SØRENSEN, T., and WESTERGAARD, J.G. Comparison between two IUDs: Progestasert and CuT 200. Contraceptive Delivery Systems 2(4): 281-286. October 1981.

283. LEE, H.Y., KIM, S.I., and KWON, E.H. Clinical trial on reversible male contraceptive with long-acting sex hormones. Seoul Journal of Medicine 20(3): 199-216. September 1979.

284. LEIMAN, G. Depo-medroxyprogesterone acetate as a contraceptive agent: its effect on weight and blood pressure. American Journal of Obstetrics and Gynecology 144(1): 97-102. September 1, 1972.

285. LESOTHO. CENTRAL BUREAU OF STATISTICS. MINISTRY OF PLANNING AND STATISTICS. Lesotho fertility survey, 1977: first report: vol. 1. Maseru, Lesotho, Ministry of Planning and Statistics, Central Bureau of Statistics, July 1981. (World Fertility Survey) 251 p.

*286. LEVINE, C. Depo-Provera and contraceptive risk: a case study of values in conflict. Hastings Center Report 9(4): 8-11. August 1979.

287. LEWIS, D.H., TICE, T.R., MEYERS, W.E., and COWSAR, D.R. Biodegradable microcapsules for contraceptive steroids. Presented at the Reproductive Health Care International Symposium, Maui, Hawaii, October 10-15, 1982. 3 p.

***288. LIANG, A.P., LEVENSON, A.G., LAYDE, P.M., SHELTON, J.D., HATCHER, R.A., POTTS, M., and MICHELSON, M.J. The risk of breast, uterine corpus and ovarian cancer in women using depot medroxyprogesterone acetate. Atlanta, Georgia, U.S. Centers for Disease Control, 1982. 13 p. (Mimeo)**

289. LIGHTBOURNE, R., Jr., SINGH, S., and GREEN, C.P. The World Fertility Survey: charting global childbearing. Population Bulletin 37(1): 1-55. March 1982.

290. LINTHORST, G., WIBAUT, F.P., and JONGH, R.E. DE. Ervaringen met een 3-maandelijkse injectie medroxyprogesteronacetaat (MPA) als contraceptivum. [Experiences with a 3-monthly injection of medroxyprogesterone acetate (MPA) as a contraceptive agent.] [DUT, summary in ENG] Nederlands Tijdschrift voor Geneeskunde 116: 1694-1698. September 16, 1972.

291. LISKIN, L. IUDs: an appropriate contraceptive for many women. Population Reports, Series B, No. 4. Baltimore, Maryland, Johns Hopkins University, Population Information Program, July 1982. 36 p.

292. LØBER, J., ROSE, C., SALIMTSCHIK, M., and MOURIDSEN, H.T. Treatment of advanced breast cancer with progestins: a review. Acta Obstetricia et Gynecologica Scandinavica 101(Suppl.): 39-46. 1981.

293. LOBL, T.J., KIRTON, K.T., FORBES, A.D., EWING, L.L., KEMP, P.L., and DESJARDINS, C. Contraceptive efficacy of testosterone-estradiol implants in male rhesus monkeys. [1983]. 7 p. (Unpublished)

294. LOPEZ, D.F. and CONCEPCION, L.B. Controlled clinical investigation of the depot contraceptive norethisterone oenanthate in the Philippines. In: McDaniel, E.B., ed. Second Asian Regional Workshop on Injectable Contraceptives, Chang Mai, Thailand, 1981. Oklahoma City, Oklahoma, World Neighbors, October 1982. p. 60-61.

295. LUUKKAINEN, T. [Steroid Research Laboratory, University of Helsinki, Finland] [Development of contraceptive implants containing progestin ST-1435] Personal communication, September 2, 1982.

296. LUUKKAINEN, T. [Steroid Research Laboratories, University of Helsinki, Finland] [Levonorgestrel IUD] Personal communication, January 27, 1982.

*297. LUUKKAINEN, T. and NILSSON, C.G. The development of levonorgestrel IUD. [1982]. 29 p. (Unpublished)

298. LUUKKAINEN, T. and NILSSON, C.G. Sustained intrauterine release of d-norgestrel. Contraception 18(4): 451-458. October 1978.

299. MACKAY, E.V., KHOO, S.K., and ADAM, R.R. Contraception with a six-monthly injection of progestogen: 1. Effects on blood pressure, body weight and uterine bleeding pattern, side effects, efficacy, and acceptability. Australian and New Zealand Journal of Obstetrics and Gynaecology 11(3): 148-155. August 1971.

300. MAHGOUB, S. EL. Body weight and cycle control of injectable contraceptives. Journal of Reproductive Medicine 24(3): 119-126. March 1980.

301. MAHGOUB, S. EL. Long-term intracervical contraception with a levonorgestrel device. Contraception 25(4): 357-374. April 1982.

302. MAHGOUB, S. EL. The norgestrel-T IUD. Contraception 22(3): 271-286. September 1980.

303. MAHGOUB, S. EL, GAMAL, Y. EL, KARIM, M., WISHAH, A., HASSAN-ALY, R., and MADIHA, H. Effects of injectable progestogens on the immunologic power of breast milk. International Journal of Gynaecology and Obstetrics 10(2): 48-51. March 1972.

304. MAHGOUB, S. EL and KARIM, M. The long-term use of injectable norethisterone enanthate as a contraceptive. Contraception 5(1): 21-29. January 1972.

305. MAHGOUB, S. EL, KARIM, M., and AMMAR, R. Long-term use of depot medroxy progesterone acetate as a contraceptive. Acta Obstetricia et Gynecologica Scandinavica 51: 251-255. 1972.

*306. MAHONEY, R.T. and CLINTON, J.J. The introduction of the Norplant to family planning programs: an overview. Presented at the Conference on Recent Advances in Fertility Regulation, Surabaya, East Java, Indonesia, December 18-20, 1980. 26 p.

307. MANTHE, H. and TAFUR, A. [Laboratorios Pharmétique S.A.] [Sales statistics on Perlutal, injectable contraceptive] Personal communication, February 9, 1983.

308. MAQUEO-TOPETE, M., BERMAN, E., SOBERON, J., and CALDERON, J.J. A pill-a-month contraceptive. Fertility and Sterility 26: 884-891. November-December 1969.

309. MAULDIN, W.P. Experience with contraceptive methods in developing countries. In: United States. National Research Council. Division of Medical Sciences and Committee on Contraceptive Technology. Contraception, science, technology, and application: proceedings of a symposium. Washington, D.C., National Academy of Sciences, 1979. p. 50-104.

310. MCCANN, M.F., LISKIN, L.S., PIOTROW, P.T., RINEHART, W., and FOX, G. Breast-feeding, fertility, and family planning. Population Reports, Series J, No. 24. Baltimore, Maryland, Johns Hopkins University, Population Information Program, November-December 1981. 50 p.

311. MCDANIEL, E.B. [Testimony, presented by Allan Rosenfield] In: United States. Food and Drug Administration. Proceedings of the Depo-Provera Public Board of Inquiry, [Washington, D.C.], January 12, 1983. Vol 3. Arlington, Virginia, TIW Reporting Group, 1983. p. 80-84.

*312. MCDANIEL, E.B. Endometrial carcinoma survey in Thailand. IPPF Medical Bulletin 13(6): 3. December 1979.

313. MCDANIEL, E.B. "Mini-manual" for use of DMPA as an injectable contraceptive. 2nd ed. December 10, 1973. 12 p. (Unpublished)

314. MCDANIEL, E.B. 1973 annual family planning report: combined family planning clinics in or under the auspices of McCormick Hospital, Chiang Mai, Thailand. 1974. 4 p. (Unpublished)

315. MCDANIEL, E.B. [McCormick Family Planning Program, Chiang Mai, Thailand] [Price of locally packaged DMPA] Personal communication, February 10, 1983.

316. MCDANIEL, E.B. [McCormick Family Planning Program, Chiang Mai, Thailand] [Program acceptor statistics, 1981-1982] Personal communication, November 22, 1982.

*317. MCDANIEL, E.B., ed. Second Asian Regional Workshop on Injectable Contraceptives, Chiang Mai, Thailand, 1981. Oklahoma City, Oklahoma, World Neighbors, October 1982. 93 p.

318. MCDANIEL, E.B. Training of staff of McCormick Hospital Family Planning Program. In: A report of the First Asian Regional Workshop on Injectable Contraceptives, Chiang Mai, Thailand, May 15-19, 1978. Chiang Mai, McCormick Hospital Family Planning Program, World Neighbors, International Planned Parenthood Federation and Oxfam, 1978. p. 26-29.

319. MCDANIEL, E.B. [McCormick Family Planning Program, Chiang Mai, Thailand] [Use of Depo-Provera in the McCormick Family Planning Program] Personal communication, November 20, 1982.

320. MCDANIEL, E. and PARDTHAISONG, T. Acceptability of an injectable contraceptive in a rural population of Thailand. In: International Planned Parenthood Federation (IPPF). South-East Asia and Oceania Regional Office. Clinical proceedings of International Planned Parenthood Federation South-East Asia & Oceania Regional Medical & Scientific Congress, Sydney, August 14-18, 1972. Colombo, Sri Lanka, IPPF Regional Office [1972]. p. 80-83.

321. MCDANIEL, E.B. and PARDTHAISONG, T. Depot-medroxyprogesterone acetate as a contraceptive agent: return of fertility after discontinuation of use. Contraception 8(5): 407-415. November 1973.

322. MCDANIEL, E.B. and PARDTHAISONG, T. Incidence of breast nodules in women receiving multiple doses of medroxyprogesterone acetate. Journal of Biosocial Science 5(1): 83-88. 1973.

*323. MCDANIEL, E.B. and PARDTHAISONG, T. Return of fertility after discontinuation of DMPA, pills, and IUD's for planned pregnancy. In: Talwar, G.P., ed. Recent advances in reproduction and regulation of fertility: proceedings of the Symposium on Recent Advances in Reproduction and Regulation of Fertility held in New Delhi, October 24-28, 1978. New York, Elsevier/North-Holland Biomedical Press, 1979. p. 569-571.

324. MCDANIEL, E.B. and PARDTHAISONG, T. Use of a long-acting injectable contraceptive in a post partum family planning programme. Asian Journal of Medicine 9: 133-135. April 1973.

325. MCDANIEL, E.B. and PARDTHAISONG, T. Use-effectiveness of six-month injections of DMPA as a contraceptive. American Journal of Obstetrics and Gynecology 119(2): 175-180. May 15, 1974.

326. MCDANIEL, E.B., PARDTHAISONG, T., and GRAY, R. The epidemiology of the acceptance and use of Depo-Provera in Chieng Mai, northern Thailand. Presented at conference of the International Epidemiologic Association, Brighton, United Kingdom, August 1974. 9 p.

327. MCDANIEL, E.B. and POTTS, M. International forum update: depot medroxyprogesterone acetate and endometrial carcinoma. International Journal of Gynaecology and Obstetrics 17(3): 297-299. November-December 1979.

328. MCDANIEL, E.B. and ZELENIK, J.S. Field trials results of long-acting injectable medroxyprogesterone acetate as an injectable contraceptive in 1,730 patients. In: Israel Academy of Sciences and Humanities. Selected papers on antifertility agents: reprinted from Proceedings of the Sixth World Congress on Fertility and Sterility, Tel Aviv, 1968. Jerusalem, Israel Academy of Sciences and Humanities, 1970. p. 13-20.

329. MCDONALD, O.P. [National Family Planning Board, Jamaica] [Use of Depo-Provera in Jamaica] Personal communication, January 6, 1983. 4 p.

330. MEHTA, S., JOSHI, U.M., SANKOLLI, G.M., ADATIA, A., DONDE, U.M., and SAXENA, B.N. Clinical performance and endocrine profiles with contraceptive vaginal rings containing a combination of estradiol and d-norgestrel. Contraception 23(3): 241-250. March 1981.

331. MELIS, G.B., STRIGINI, F., FRUZZETTI, F., PAOLETTI, A.M., RAINER, E., DÜSTERBERG, B., and FIORETTI, P. Norethisterone enanthate as an injectable contraceptive in puerperal and non-puerperal women. Contraception 23(1): 77-88. January 1981.

332. MELO, J.F. and COUTINHO, E.M. Inhibition of spermatogenesis in men with monthly injections of medroxyprogesterone acetate and testosterone enanthate. Contraception 15(6): 627-634. June 1977.

333. METTLER, L., SHIRWANI, D., and BRUNNBERG, F.J. Thrombocyte function in relation to the long term application of medroxyprogesterone acetate as a female contraceptive agent. Journal of Postgraduate Medicine 25(3): 154-157. July 1979.

334. MILLER, M. [Alza Corporation] [Use of Progestasert IUD] Personal communication, February 24, 1983.

335. MILLER, N.E., FORDE, O.H., THELLE, D.S., and MJOS, O.D. The tromso heart-study: high-density lipoprotein and coronary heart-disease: a prospective case-control study. Lancet 1(8019): 965-968. May 7, 1977.

336. MINKIN, S. Depo-Provera: a critical analysis. Women and Health 5(2): 49-69. Summer 1980.

337. MISHELL, D.R., Jr. Effect of 6α-methyl-17α-hydroxyprogesterone on urinary excretion of luteinizing hormone. American Journal of Obstetrics and Gynecology 99(1): 86-90. September 1, 1967.

338. MISHELL, D.R., Jr. and FREID, N.D. Life table analysis of a clinical study of a once-a-month oral steroid contraceptive quinestrol-quingestanol. Contraception 8(1): 37-42. July 1973.

339. MISHELL, D.R., Jr. and LUMKIN, M.E. Contraceptive effect of varying dosages of progestogen in Silastic vaginal rings. Fertility and Sterility 21(2): 99-103. February 1970.

340. MISHELL, D.R., Jr., LUMKIN, M., and JACKANICZ, T. Initial clinical studies of intravaginal rings containing norethindrone and norgestrel. Contraception 12(3): 253-260. September 1975.

341. MISHELL, D.R., Jr., LUMKIN, M., and STONE, S. Inhibition of ovulation with cyclic use of progestogen-impregnated intravaginal devices. American Journal of Obstetrics and Gynecology 113(7): 927-932. August 1, 1972.

342. MISHELL, D.R., Jr., MOORE, D.E., ROY, S., BRENNER, P.F., and PAGE, M.A. Clinical performance and endocrine profiles with contraceptive vaginal rings containing a combination of estradiol and d-norgestrel. American Journal of Obstetrics and Gynecology 130(1): 55-62. January 1, 1978.

343. MISHELL, D.R., Jr., ROY, S., MOORE, D.E., BRENNER, P.F., and PAGE, M.A. Clinical performances and endocrine profiles with contraceptive vaginal rings containing d-norgestrel. Contraception 16(6): 625-636. December 1977.

344. MISHELL, D.R., Jr., TALAS, M., PARLOW, A.F., HABASHY, M. EL-, and MOYER, D.L. Physiologic and morphologic alterations effected by the contraceptive use of depo-medroxyprogesterone acetate. In: Israel Academy of Sciences and Humanities. Selected papers on anti-fertility agents: reprinted from Proceedings of the Sixth World Congress on Fertility and Sterility, Tel Aviv, 1968. Jerusalem, Israel Academy of Sciences and Humanities, 1970. p. 7-12.

345. MISHELL, D.R., Jr., TALAS, M., PARLOW, A.F., and MOYER, D.L. Contraception by means of a Silastic vaginal ring impregnated with medroxyprogesterone acetate. Contraception 107(1): 100-107. May 1, 1970.

346. MOGHISSI, K.S. Newer approaches to steroidal contraceptives. In: Hafez, E.S.E. and Evans, T.N., eds. Human reproduction: conception and contraception. New York, Harper & Row, 1973. p. 447-469.

347. MOLITOR, M.P. Commentaires sur l'utilisation du MPA 150 dans un centre de planning familial. [Comments on the use of MPA 150 in a family planning center.] [FRE] Bulletin de la Société des Sciences Médicales du Grand Duché de Luxembourg 111(1): 49-53. September 1974.

348. MONEY, J., WIEDEKING, C., WALKER, P., MIGEON, C., MEYER, W., and BORGAONKAR, D. 47,XYY and 46,XY males with antisocial and/or sex-offending behavior: antiandrogen therapy plus counseling. Psychoneuroendocrinology 1(2): 165-178. 1975.

349. MOORE, D.E., ROY, S., STANCZYK, F.Z., and MISHELL, D.R., Jr. Bleeding and serum d-norgestrel, estradiol and progesterone patterns in women using d-norgestrel subdermal polysiloxane capsules for contraception. Contraception 17(4): 315-328. April 1978.

350. MORRIS, L. [US Centers for Disease Control] [Prevalence of injectable use in Brazilian contraceptive prevalence surveys] Personal communication, December 10, 1982.

351. MORRIS, L., LEWIS, G., POWELL, D.L., ANDERSON, J., WAY, A., CUSHING, J., and LAWLESS, G. Contraceptive Prevalence Surveys: a new source of family planning data. Population Reports, Series M, No. 5. Baltimore, Maryland, Johns Hopkins University, Population Information Program, May-June 1981. 40 p.

352. MORRISON, J.C., MARTIN, D.C., BLAIR, R.A., ANDERSON, G.D., KINCHELOE, B.W., BATES, G.W., HENDRIX, J.W., RIVLIN, M.E., FORMAN, E.K., PROPST, M.G., and NEEDHAM, R. The use of medroxyprogesterone acetate for relief of climacteric symptoms. American Journal of Obstetrics and Gynecology 138(1): 99-104. September 1, 1980.

353. MUKHERJEA, M. Depo-Provera: clinical evaluation. Contraceptive Delivery Systems 2(3): 259-269. July 1981.

354. MUKHERJEA, M., MUKHERJEE, P., BISWAS, R., CHAKRABORTY, A.S., and KUSHARI, J. Effect of medroxyprogesterone acetate contraception on human serum enzymes. International Journal of Fertility 26(1): 35-39. 1981.

355. MUKHERJEE, P., BISWAS, R., BANERJEE, S.K., and MUKHERJEA, M. Effect of Depo-Provera on the activity of some enzymes and lipid levels of human blood. In: Pachauri, S., ed. Fourth transaction of scientific papers at the India FRP Contributors' Conference, Bombay, February 24, 1977. Calcutta, India Fertility Research Programme, September 1977. p. 225-230.

356. MYNTTI, C. Population processes in rural Yemen: temporary emigration, breastfeeding, and contraception. Studies in Family Planning 10(10): 282-289. October 1979.

357. NACHTIGALL, L.E., NACHTIGALL, R.H., NACHTIGALL, R.D., and BECKMAN, E.M. Estrogen replacement therapy: 2. A prospective study in the relationship to carcinoma and cardiovascular and metabolic problems. Obstetrics and Gynecology 54(1): 74-79. July 1979.

*358. NARKAVONNAKIT, T., BENNETT, T., and BALAKRISHNAN, T.R. Continuation of injectable contraceptives in Thailand. Studies in Family Planning 13(4): 99-105. April 1982.

*359. NASH, H.A. Depo-Provera: a review. Contraception 12(4): 377-394. October 1975.

360. NASH, H. [Population Council] [Contraindications for contraceptive implants and vaginal rings.] Personal communication, February 8, 1983.

361. NASH, H. [Population Council] [Development of contraceptive implants and vaginal rings] Personal communication, November 18, 1982.

*362. NASH, H.A. and JACKANICZ, T.M. Contraceptive vaginal rings. In: Mishell D.R., Jr., ed. Advances in fertility research. Vol. 1. New York, Raven Press, 1982. p. 129-144.

363. NASH, H.A., ROBERTSON, D.N., and JACKANICZ, T.M. Release of contraceptive steroids from sustained release dosage forms and resulting plasma levels. Contraception 18(4): 395-409. October 1978.

*364. NASH, H.A., ROBERTSON, D.N., MOO YOUNG, A.J., and ATKINSON, L.E. Steroid release from silastic capsules and rods. Contraception 18(4): 367-394. October 1978.

365. NATIONAL CANCER ADVISORY BOARD. SUBCOMMITTEE ON ENVIRONMENTAL CARCINOGENESIS. General criteria for assessing the evidence for carcinogenicity of chemical substances: report of the Subcommittee on Environmental Carcinogenesis. Journal of the National Cancer Institute 58(2): 461-465. February 1977.

366. NATRAJAN, P.K., MULDOON, T.G., GREENBLATT, R.B., and MAHESH, V.B. Estradiol and progesterone receptors in estrogen-primed endometrium. American Journal of Obstetrics and Gynecology 140(4): 387-392. June 15, 1981.

367. NELSON, L.W., CARLTON, W.W., and WEIKEL, J.H., Jr. Canine mammary neoplasms and progestogens. Journal of the American Medical Association 219(12): 1601-1606. March 20, 1972.

368. NEUMANN, F., BERSWORDT-WALLRABE, R. VON, ELGER, W., GRÄF, K.-J., HASAN, S.H., MEHRING, M., NISHINO, Y., and STEINBECK, H. Special problems in toxicity testing of long acting depot contraceptives. Acta Endocrinologica (Suppl. 185): 315-354. 1974.

369. NEWTON, J. and SZONTAGH, F. A collaborative study of the progesterone intrauterine device (Progestasert). Contraception 19(6): 575-589. June 1979.

370. NILSSON, C.G. Comparative quantitation of menstrual blood loss with a d-norgestrel-releasing IUD and a Nova-T-copper device. Contraception 15(4): 379-387. April 1977.

371. NILSSON, C.G. Fertility after discontinuation of levonorgestrel-releasing intrauterine devices. Contraception 25(3): 273-278. March, 1982.

372. NILSSON, C.G. and HOLMA, P. Menstrual blood loss with contraceptive subdermal levonorgestrel implants. Fertility and Sterility 35(3): 304-306. March 1981.

373. NILSSON, C.G., LÄHTEENMÄKI, P., and LUUKKAINEN, T. Levonorgestrel plasma concentrations and hormone profiles after insertion and after one year of treatment with a levonorgestrel-IUD. Contraception 21(3): 225-233. March 1980.

374. NILSSON, C.G., LÄHTEENMÄKI, P., and LUUKKAINEN, T. Patterns of ovulation and bleeding with a low levonorgestrel-releasing intrauterine device. Contraception 21(2): 155-164. February 1980.

375. NILSSON, C.G., LUUKKAINEN, T., DIAZ, J., and ALLONEN, H. Clinical performance of a new levonorgestrel-releasing intrauterine device: a randomized comparison with a Nova-T-copper device. Contraception 25(4): 345-356. April 1982.

376. NILSSON, C.G., LUUKKAINEN, T., DIAZ, J., and ALLONEN, H. Intrauterine contraception with levonorgestrel: a comparative randomised clinical performance study. Lancet 1(8220): 577-580. March 14, 1981.

377. NOBBE, C.E. [Canadian International Development Agency (CIDA)] [CIDA provision of Depo-Provera] Personal communication, September 23, 1981.

378. NUÑEZ, J.A. Clinical experience with medroxyprogesterone acetate administered every 6 mth. [Abstract] In: Kleinman, R. and Pickles, V.R., eds. Seventh World Congress on Fertility and Sterility, Kyoto, Japan, October 17-25, 1971. Amsterdam, Excerpta Medica, 1971. (International Congress Series No. 234a) p. 85.

379. NUÑEZ, J.A. Clinical experience with medroxyprogesterone acetate injected every 3 months. Presented at the Sixth Latin-American Ob-Gyn Meeting, San José, Costa Rica, March 29-April 7, 1970. 13 p.

380. NUTTAL, I.D. and ELSTEIN, M. Steroid releasing vaginal rings. Acta Europaea Fertilitatis 11(3): 225-230. September 1980.

381. ODLIND, V., MOO-YOUNG, A.J., GUPTA, G.N., WEINER, E., and JOHANSSON, E.D.B. Subdermal norethindrone pellets: a method for contraception? Contraception 19(6): 639-646. June 1979.

382. ODLIND, V., WEINER, E., and JOHANSSON, E.D.B. Plasma levels of norethindrone and effect upon ovarian function during treatment with silastic implants containing norethindrone. Contraception 19(2): 197-206. February 1979.

383. OJO, O.A. International forum: [acceptability and efficacy of DMPA] International Journal of Gynaecology and Obstetrics 16(5): 439-441. 1978-1979.

384. ORTIZ, A., HIROI, M., STANCZYK, F.Z., GOEBELSMANN, U., and MISHELL, D.R., Jr. Serum medroxyprogesterone acetate (MPA) concentrations and ovarian function following intramuscular injection of Depo-MPA. Journal of Clinical Endocrinology and Metabolism 44(1): 32-38. January 1977.

385. PARAGUAY. DIRECCION GENERAL DE ESTADISTICA Y CENSOS. Encuesta Nacional de Fecundidad. [National Fertility Survey] [SPA]. [Asunción], Paraguay, Dirección General de Estadística y Censos, 1981. 662 p.

*386. PARDTHAISONG, T. Return of fertility after use of the injectable contraceptive Depo-Provera: updated analysis. In: McDaniel, E.B., ed. Second Asian Regional Workshop on Injectable Contraceptives, Chiang Mai, Thailand, 1981. Oklahoma City, Oklahoma, World Neighbors, October 1982. p. 30-38.

*387. PARDTHAISONG, T., GRAY, R.H., and MCDANIEL, E.B. Return of fertility after discontinuation of depot medroxyprogesterone acetate and intra-uterine devices in northern Thailand. Lancet 1(8167): 509-512. March 8, 1980.

*388. PARKER, R.A. and MCDANIEL, E.B. The use of quinesterol for the control of vaginal bleeding irregularities caused by DMPA. Contraception 22(1): 1-7. July 1980.

389. PARVEEN, L., CHOWDHURY, A.Q., and CHOWDHURY, Z. Injectable contraception (medroxyprogesterone acetate) in rural Bangladesh. Lancet 2(8045): 946-948. November 5, 1977.

390. PATTERSON, J.W. Medroxyprogesterone acetate: a report on ten years of use of Depo Provera in family planning programme in Jamaica. Presented at the Meeting of the International Family Planning Research Association, Palm Springs, California, October 22, 1974. 4 p.

391. PATTINSON, H.A., NUTALL, I.D., and ELSTEIN, M. A preliminary report on the intracervical contraceptive device—its effect on cervical mucus. In: Chantler, E.N., Elder, J.B., and Elstein, M., eds. Mucus in health and disease: 2. New York, Plenum, 1982. p. 289-291.

*392. PAULSEN, C.A., BREMNER, W.M., and LEONARD, J.M. Male contraception: clinical trials. In: Mishell, D.R., Jr., ed. Advances in fertility research. Vol. 1. New York, Raven Press, 1982. p. 157-170.

393. PERKIN, G.W. [Program for the Introduction and Adaptation of Contraceptive Technology] [Marketing the Norplant contraceptive system] Personal communication, November 18, 1982.

394. PERKIN, G.W. [Program for the Introduction and Adaptation of Contraceptive Technology] [Production of injectables in China; production of DMPA in Eastern Europe] Personal communication, February 23, 1983.

of Contraceptive Technology] [Production of injectables in China] Personal communication, February 23, 1983.

*395. PERKIN, G.W., GENSTEIN, J., and MORROW, M. Contraceptive use in China. PIACT Product News 2(1): 1-8. [1980].

396. PERKIN, G. and SAUNDERS, L. Programme implications of fertility regulating methods. July 1974. 19 p. (Unpublished)

397. PERKINS, R.P. Contraception for sicklers. New England Journal of Medicine 285(5): 296. July 29, 1971.

398. PHARRISS, B. and SCHMITT, E. Development of bioerodable contraceptive insert. In: Hafez, E.S.E. and Os, W.A.A. Van, eds. Biodegradables and delivery systems for contraception. Boston, Massachusetts, G.K. Hall, 1980. (Progress in Contraceptive Delivery Systems Vol. 1) p. 177-178.

399. PITT, C., CHRISTENSEN, D., JEFFCOAT, R., KIMMEL, G.L., SCHINDLER, A., WALL, M.E., and ZWEIDINGER, R.A. Biodegradable polymers and sustained delivery of contraceptive drugs. In: Gabelnick, H.L., ed. Drug delivery systems: proceedings of a workshop sponsored by Contraceptive Development Branch, Center for Population Research, National Institute of Child Health and Human Development, Bethesda, Maryland, August 2-3, 1976. Bethesda, Maryland, U.S. Department of Health, Education, and Welfare, 1977. (DHEW Publication No. NIH 77-1238) p. 141-192.

400. PIVER, M.S., BARLOW, J.J., LURAIN, J.R., and BLUMENSON, L.E. Medroxyprogesterone acetate (Depo-Provera) vs. hydroxyprogesterone caproate (Delalutin) in women with metastatic endometrial adenocarcinoma. Cancer 45(2): 268-272. January 15, 1980.

401. POOL, I. The Depo-Provera controversy. New Zealand Population Review 6(4): 26-36. December 1980.

402. POPULATION COUNCIL. INTERNATIONAL COMMITTEE FOR CONTRACEPTION RESEARCH. Contraception with long acting subdermal implants: 1. An effective and acceptable modality in international clinical trials. Contraception 18(4): 315-333. October 1978.

403. POPULATION COUNCIL. INTERNATIONAL COMMITTEE FOR CONTRACEPTION RESEARCH. Contraception with long acting subdermal implants: 2. Measured and perceived effects in international clinical trials. Contraception 18(4): 335-353. October 1978.

404. POTTS, M. [Family Health International] [Popularity of once-a-month injectables: indications for use of progestin-only contraception] Personal communication, February 1983.

405. POWELL, L.C. and SEYMOUR, R.J. Effects of depo-medroxyprogesterone acetate as a contraceptive agent. American Journal of Obstetrics and Gynecology 110(1): 36-41. May 1, 1971.

406. PREMA, K. Duration of lactation and return of menstruation in lactating women using hormonal contraception and IUDs. Contraceptive Delivery Systems 3(1): 39-46. January 1982.

407. PREMA, K., GAYATHRI, T.L., RAMALAKSHMI, B.A., MADHAVAPEDDI, R., and PHILIPS, F.S. Low dose injectable contraceptive norethisterone enanthate 20mg monthly: 1. Clinical trials. Contraception 23(1): 11-22. January 1981.

408. PREMA, K., RAMALAKSHMI, B.A., and BABU, S. Serum copper and zinc in hormonal contraceptive users. Fertility and Sterility 33(3): 267-271. March 1980.

409. PROGRAM FOR THE INTRODUCTION AND ADAPTATION OF CONTRACEPTIVE TECHNOLOGY (PIACT). Norplant: instructions for clinicians. Rev. ed. [Seattle, Washington] PIACT, 1982. 16 p.

410. PROGRAM FOR THE INTRODUCTION AND ADAPTATION OF CONTRACEPTIVE TECHNOLOGY (PIACT). Norplant: manual for fieldworkers. [Seattle, Washington] PIACT, 1981. 19 p.

411. PUGA, J., PUPKIN, M., ZAÑARTU, J., GARCIA-HUIDOBRO, M., ROSENBERG, J., GUERRERO, R., and SERON, M. Contribution to study of the main physiological aspects of the inhibition of ovulation. In: Wood, C. and Walters, W.A., eds. Fifth World Congress of Gynaecology and Obstetrics, Sydney, Australia, September 1967. New York, Appleton-Century-Crofts, 1967. p. 247-271.

412. RADEL, D. [World Bank] [World Bank provision of injectable contraceptives] Personal communication, December 16, 1982.

413. RAHMAN, S.A., JHA, P., LAUMAS, V., JAIN, A.K., DILEEPKUMAR, TAKKAR, D., HINGORANI, V., and LAUMAS, K.R. Effect of norethindrone acetate released from a single silastic implant on serum FSH, LH, progesterone and estradiol-17β-of women during first eight months of treatment. Contraception 16(5): 487-497. November 1977.

414. RAKUSEN, J. Depo-Provera: the extent of the problem: a case study in the politics of birth control. In: Roberts, H., ed. Women, health and reproduction. London, Routledge and Kegan Paul, 1981. p. 75-108.

415. RALL, H.J.S., FERREIRA, G.S., and JANSSENS, K.Y. Effect of medroxyprogesterone acetate contraception on cytoplasmic estrogen receptor content of the human cervix uteri. International Journal of Fertility 23(1): 51-56. 1978.

416. RALL, H.J.S., NIEKERK, W.A. VAN, ENGELBRECHT, B.H.J., and SCHALKWYK, D.J. Comparative contraceptive experience with three-month and six-month medroxyprogesterone acetate regimens. Journal of Reproductive Medicine 18(2): 55-60. February 1977.

417. RAM, E.R., DATTA, B.K., KAMLE, M.N., and THOMAS, K. Control of fertility by three-month contraceptive injection of Depo-Provera. Journal of the Christian Medical Association of India 51(9-10): 228-236. September-October 1976.

418. RAUTIO, A., KAUPPILA, A.J., TUIMALA, R.J., and SOTANIEMI, E.A. Antipyrine metabolism and liver function in patients treated with high-dose medroxyprogesterone. [ENG, summary in FRE] Biomedicine 31(5): 135-138. September 1979.

419. RICE-WRAY, E., GUTIERREZ, J., GORODOVSKY, J., MAQUEO, M., and GOLDZIEHER, J.W. Injectable contraceptives in family planning: clinical experience in 14,958 cycles. In: Lewit, S., ed. Advances in planned parenthood. Vol. 8: proceedings of the 10th annual meeting of the American Association of Planned Parenthood Physicians, Detroit, Michigan, April 6-7, 1972. Amsterdam, Excerpta Medica, 1973. p. 103-113.

420. RINEHART, W. Minipill: a limited alternative for certain women. Population Reports, Series A, Number 3. Washington, D.C., Population Information Program, September 1975. 16 p.

421. RINEHART, W. and FELT, J.C. Debate on oral contraceptives and neoplasia continues: answers remain elusive. Population Reports, Series A, No. 4. Washington, D.C., Population Information Program, May 1977. 36 p.

422. RINEHART, W. and WINTER, J. Injectable progestogens—officials debate but use increases. Population Reports, Series K, No. 1. Washington, D.C., Population Information Program, March 1975. 16 p.

423. RIVERA, R., ALMONTE, H., ARREOLA, M., LOPEZ, F., MONARREZ, G., NAVARRO, C., ORTIZ, E., PERKIN, G.W., and RUIZ, R. The effects of three different regimens of oral contraceptives and three different intrauterine devices on the levels of hemoglobin, serum iron and iron binding capacity in anemic women. [1981]. 17 p. (Unpublished)

424. RIVERA, R., ALMONTE, H., ARREOLA, M., LOPEZ, F., MONARREZ, G., NAVARRO, C., ORTIZ, E., PERKIN, G.W., and RUIZ, R. The use of different hormonal contraceptives and IUDs in anemic women: a six-month follow-up. Advances in Planned Parenthood 15(2): 56-63. 1980.

425. ROBERTSON, D. [Population Council] [Manufacture of vaginal rings] Personal communication, November 18, 1982.

426. ROBERTSON, D.N., ALVAREZ, F., SIVIN, I., BRACHE, V., STERN, J., LEON, P., and FAUNDES, A. Lipoprotein patterns in women in Santo Domingo using a levonorgestrel/estradiol contraceptive ring. Contraception 24(4): 469-480. October 1981.

427. ROGERS, E.M. Communication strategies for family planning. New York, Free Press, 1973. 451 p.

428. ROSENFIELD, A.G. [Center for Population and Family Health, Columbia University] [Removal of contraceptive implants] Personal communication, March 1, 1983.

*429. ROSENFIELD, A., BENNETT, A., VARAKAMIN, S., and LAURO, D. Thailand's family planning program: an Asian success story. International Family Planning Perspectives 8(2): 43-51. June 1982.

430. ROWE, P.J. [World Health Organization (WHO)] [Three randomized multicenter trials] Personal communication, January 6, 1982.

431. ROWE, P.J. [World Health Organization (WHO)] [WHO studies of vaginal rings] Personal communication, November 30, 1982.

432. ROWE, P.J., KOETSAWANG, S., PIZARRO, E., and DIETHELM, P. Comparative bleeding patterns of a progesterone-releasing IUD. In: Hefnawi, F. and Segal, S.J., eds. Analysis of intrauterine contraception. Amsterdam, North-Holland, 1975. p. 185-198.

433. ROY, S., KRAUSS, R.M., MISHELL, D.R., Jr., CASAGRANDE, J., and PIKE, M.C. The effect on lipids and lipoproteins of a contraceptive vaginal ring containing levonorgestrel and estradiol. Contraception 24(4): 429-449. October 1981.

*434. ROY, S. and MISHELL, D.R., Jr. Contraceptive vaginal rings: mechanism of action and historical development. In: Hafez, E.S.E and Os, W.A.A. Van, eds. Biodegradables and delivery systems for contraception. Boston, Massachusetts, G.K. Hall, 1980. (Progress in Contraceptive Delivery Systems Vol. 1) p. 163-174.

435. ROY, S., MISHELL, D.R., Jr., GRAY, G., DOZONO-TAKANO, R., BRENNER, P.F., EIDE, I., QUATTRO, V. DE, and SHAW, S.T. Comparison of metabolic and clinical effects of four oral contraceptive formulations and a contraceptive vaginal ring. American Journal of Obstetrics and Gynecology 136(7): 920-931. April 1, 1980.

436. ROY, S., WILKINS, J., and MISHELL, D.R., Jr. The effect of a contraceptive vaginal ring and oral contraceptives on the vaginal flora. Contraception 24(4): 481-491. October 1981.

437. ROYAL COLLEGE OF GENERAL PRACTITIONERS. ORAL CONTRACEPTION STUDY. Further analyses of mortality in oral contraceptive users. Lancet 1(8219): 541-546. March 7, 1981.

438. ROZIER, J.C., Jr. and UNDERWOOD, P.B., Jr. Use of progestational agents in endometrial adenocarcinoma. Obstetrics and Gynecology 44(1): 60-64. July 1974.

*439. RUBIN, G.L., ORY, H.W., LAYDE, P.M., WINGO, P.A., and WEBSTER, L.A. Oral contraceptive use and the risk of endometrial cancer. Journal of the American Medical Association 249(12): 1600-1604. March 25, 1983.

440. RUBIO, B.L. and GONZALEZ, R.A. Contraception with medroxyprogesterone acetate: a follow-up study of 1,892 cycles. In: Israel Academy of Sciences and Humanities. Selected papers on anti-fertility agents: reprinted from proceedings of the Sixth World Congress on Fertility and Sterility, Tel Aviv, 1968. Jerusalem, Israel Academy of Sciences and Humanities, 1970. p. 21-26.

441. RUBIO-LOTVIN, B., GONZALEZ ANSORENA, R., RUIZ MORENO, J.A., and BOLIO ARISTA, R. Terapia anticonceptiva combinada a dosis baja en administración parenteral mensual (communicación preliminar). [Low-dose combined contraceptive therapy in monthly injections (preliminary report).] [SPA] Ginecología y Obstetricia de México 38: 225-231. September 1975.

442. RUBIO LOTVIN, B., RUIZ MORENO, J.A., BOLIO ARISTA, R., and GONZALEZ ANSORENA, R. Experiencia con Ciclo-Provera, anticonceptivo mensual parenteral: comunicación preliminar. [Experience with Cyclo-Provera, a monthly injectable contraceptive: preliminary report.] [SPA] Prensa Médica Mexicana 39(1-2): 48-50. January-February 1974.

443. RUIZ-VALESCO, V., ORNELAS-PEREZ, A., and MENDOZA-AVILA, R. Postpartum norethindrone: single dose. Advances in Planned Parenthood 14(3): 107-113. 1979.

444. RYBO, G. and BERGQVIST, A. Comparison of menstrual blood loss with the Progestasert system and the CU-T-200: preliminary results. In: Mishell, D.R., Jr. and Martinez-Manautou, J., eds. Proceedings of a Symposium on Clinical Experience with the Progesterone Uterine Therapeutic System, Acapulco, Mexico, October 15-16, 1976. Princeton, New Jersey, Excerpta Medica, 1978. p. 106-110.

445. SALA, G., CASTEGNARO, E., LENAZ, G.R., MARTONI, A., PIANA, E., and PANNUTI, F. Hormone interference in metastatic breast cancer patients treated with medroxyprogesterone acetate at massive doses. preliminary results. IRCS Journal of Medical Science 6(4): 129. April 1978.

446. SALEH, F.M. Serum protein-bound carbohydrate and seromucoid levels during long-acting progestational contraceptive therapy. Contraception 16(4): 399-407. October 1977.

447. SALEH, F.M. and ABD-EL-HAY, M.M. Liver function tests after the use of long-acting progestational contraceptives. Contraception 16(4): 409-416. October 1977.

448. SANG, G.W., FOTHERBY, K., HOWARD, G., ELDER, M., and BYE, P.G. Pharmacokinetics of norethisterone oenanthate in humans. Contraception 24(1): 15-27. July 1981.

449. SATAYASTHIT, N., TANKEYOON, M., and CHAUDHURY, R.R. The effect of medroxyprogesterone acetate administered to the lactating rat, on the subsequent growth, maturation and reproductive function of the litter. Journal of Reproduction and Fertility 46(2): 411-412. March 1976.

450. SAXENA, B.N., DUSITSIN, N., TANKEYOON, M., and CHAUDHURY, R.R. Return of ovulation after the cessation of depot-medroxyprogesterone acetate treatment in Thai women. Journal of the Medical Association of Thailand 63(2): 66-69. February 1980.

451. SAXENA, B.N., SHRIMANKER, K., and GRUDZINSKAS, J.G. Levels of contraceptive steroids in breast milk and plasma of lactating women. Contraception 16(6): 605-613. December 1977.

*452. SCHARDEIN, J.L. Congenital abnormalities and hormones during pregnancy: a clinical review. Teratology 22(3): 251-270. December 1980.

453. SCHERING AG. [1982 sales of Noristerat] Personal communication to Hanni Ellis. March 1, 1983.

454. SCHERING AG. [Noristerat availability and sales information] Personal communication to Hanni Ellis, September 1982. 3 p.

455. SCHMIDT, A.M. [US Food and Drug Administration] [Depo-Provera] Personal communication to L.H. Fountain, October 1974. 2 p.

456. SCHMIDT, A.M. Patient labeling of medroxyprogesterone acetate injectable contraceptive. Federal Register 39(178): 32907-32911. September 12, 1974.

*457. SCHWALLIE, P.C. The effect of depot-medroxyprogesterone acetate on the fetus and nursing infant: a review. Contraception 23(4): 375-386. April 1981.

458. SCHWALLIE, P.C. Experience with Depo-Provera as an injectable contraceptive. Journal of Reproductive Medicine 13(3): 113-117. September 1974.

459. SCHWALLIE, P.C. and ASSENZO, J.R. Contraceptive use-efficacy study utilizing Depo-Provera administered as an injection once every 6 months. Contraception 6(4): 315-327. October 1972.

*460. SCHWALLIE, P.C. and ASSENZO, J.R. Contraceptive use-efficacy study utilizing medroxyprogesterone acetate administered as an intramuscular injection once every 90 days. Fertility and Sterility 24(5): 331-339. May 1973.

461. SCHWALLIE, P.C. and ASSENZO, J.R. The effect of depo-medroxyprogesterone acetate on pituitary and ovarian function, and the return of fertility following its discontinuation: a review. Contraception 10(2): 181-202. August 1974.

462. SCHWARZ, B.E. Does estrogen cause adenocarcinoma of the endometrium? Clinical Obstetrics and Gynecology 24(1): 243-251. March 1981.

463. SCOMMEGNA, A., AVILA, T., LUNA, M., RAO, R., and DMOWSKI, W.P. Fertility control by intrauterine release of progesterone. Obstetrics and Gynecology 43(5): 769-779. May 1974.

464. SCOMMEGNA, A., LEE, A.W., and BORUSHEK, S. Evaluation of an injectable progestin-estrogen as a contraceptive. American Journal of Obstetrics and Gynecology 107(8): 1147-1155. August 15, 1970.

465. SCUTCHFIELD, F.D., LONG, W.N., COREY, B., and TYLER, W. Medroxyprogesterone acetate as an injectable female contraceptive. Contraception 3(1): 21-35. January 1971.

466. SEGAL, S.J. Contraceptive subdermal implants. In: Mishell, D.R., Jr., ed. Advances in fertility research. Vol. 1. New York, Raven Press, 1982. p. 117-127.

467. SEYMOUR, R.J. and POWELL, L.C. Depo-medroxyprogesterone acetate as a contraceptive. Obstetrics and Gynecology 36(4): 589-596. October 1970.

468. SHAALA, S., HEGAZY, M., RAMADAN, M., AMER, S., and TOPPOZADA, M. The effect of injectable contraceptive norethisterone enanthate on vaginal moniliasis. Singapore Journal of Obstetrics and Gynaecology 11(3): 53-56. November 1980.

469. SHEARMAN, R.P. The development of depot contraceptives. Journal of Steroid Biochemistry 6(6): 899-902. June 1975.

470. SILFVERSTOLPE, G., GUSTAFSON, A., SAMSIOE, G., and SVANBORG, A. Lipid metabolic studies in oophorectomized women: effects of three different progestogens. Acta Obstetricia et Gynecologica Scandinavica 88(Suppl.): 89-95. 1979.

471. SILVA, A.R. DA and COUTINHO, E.M. Eighteen months contraception following subdermal insertion of silastic capsules containing norgestrienone. International Journal of Fertility 23(3): 185-192. 1978.

472. SIRIWONGSE, T., SNIDVONGS, W., TANTAYAPORN, P., and LEEPIPATPAIBOON, S. Effect of depo-medroxyprogesterone acetate on serum progesterone levels when administered on various cycle days. Contraception 26(5): 487-493. November 1982.

473. SIVIN, I. Copper T IUD use and ectopic pregnancy rates in the United States. Contraception 19(2): 151-173. February 1979.

474. SIVIN, I. [Population Council] [Development of the Norplant and vaginal ring contraceptives] Personal communication, July 23, 1982.

475. SIVIN, I. [Population Council] [Issues in IUD research] Personal communication, January 27, 1982.

*476. SIVIN, I., ALVAREZ-SANCHEZ, F., DIAZ, S., MCDONALD, O., HOLMA, P., COUTINHO, E., and ROBERTSON, D.N. The Norplant contraceptive method: a report on three years of use. Studies in Family Planning 13(8-9): 258-261. August-September 1982.

*477. SIVIN, I., MISHELL, D.R., Jr., VICTOR, A., DIAZ, S., ALVAREZ-SANCHEZ, F., NIELSEN, N.C., AKINLA, O., PYORALA, T., COUTINHO, E., FAUNDES, A., ROY, S., BRENNER, P.F., AHREN, T., PAVEZ, M., BRACHE, V., GIWA-OSAGIE, O.F., FASAN, M.O., ZAUSNER-GUELMAN, B., DARZE, E., SILVA, J.C.G. DA, DIAZ, J., JACKANICZ, T.M., STERN, J., and NASH, H.A. A multicenter study of levonorgestrel-estradiol contraceptive vaginal rings: 1. Use effectiveness: an international comparative trial. Contraception 24(4): 341-358. October 1981.

*478. SIVIN, I., MISHELL, D.R., Jr., VICTOR, A., DIAZ, S., ALVAREZ-SANCHEZ, F., NIELSEN, N.C., AKINLA, O., PYORALA, T., COUTINHO, E., FAUNDES, A., ROY, S., BRENNER, P.F., AHREN, T., PAVEZ, M., BRACHE, V., GIWA-OSAGIE, O.F., FASAN, M.O., ZAUSNER-GUELMAN, B., DARZE, E., SILVA, J.C.G. DA, DIAZ, J., JACKANICZ, T.M., STERN, J., and NASH, H.A. A multicenter study of levonorgestrel-estradiol contraceptive vaginal rings: 2. Subjective and objective measures of effects: an international comparative trial. Contraception 24(4): 359-376. October 1981.

*479. SIVIN, I., MISHELL, D.R., Jr., VICTOR, A., DIAZ, S., ALVAREZ-SANCHEZ, F., NIELSEN, N.C., AKINLA, O., PYORALA, T., COUTINHO, E., FAUNDES, A., ROY, S., BRENNER, P.F., AHREN, T., PAVEZ, M., BRACHE, V., GIWA-OSAGIE, O.F., FASAN, M.O., ZAUSNER-GUELMAN, B., DARZE, E., SILVA, J.C.G. DA, DIAZ, J., JACKANICZ, T.M., STERN, J., and NASH, H.A. A multicenter study of levonorgestrel-estradiol contraceptive vaginal rings: 3. Menstrual patterns: an international comparative trial. Contraception 24(4): 377-392. October 1981.

*480. SIVIN, I., ROBERTSON, D.N., STERN, J., CROXATTO, H.B., DIAZ, S., COUTINHO, E., RITA SILVA, A. DA, ALVAREZ SANCHEZ, F., FAUNDES, A., MCDONALD, O., HOLMA, P., NIELSEN, N.C., OSLER, M., and NASH, H.A. Norplant: reversible implant contraception. Studies in Family Planning 11(7-8): 227-235. July-August 1980.

481. SIVIN, I. and STERN, J. Long-acting, more effective Copper T IUDs: a summary of U.S. experience, 1970-75. Studies in Family Planning 10(10): 263-281. October 1979.

482. SOLASH, J., PEREZ, R., KEATES, J.S., RAMASAMY, N., STEIN, H., TROYANSKY, D., ATEYEH, E., Jr., JONES, J.R., SRINIVASAN, S., and SAWYER, P.N. Hormonal steroids: effects on the vascular system. Gynecologic Investigation 6(6): 329-336. 1975.

483. SOLIS, J.A. [Pan American Health Organization (PAHO)] [PAHO provision of injectable contraceptives by country and year. Table] Personal communication, January 25, 1983. 1 p.

484. SOMBOONSUK, A., XUTO, N., GRAY, R.H., and GROSSMAN, R.A. A field study of the choice and continuity of use of three contraceptive methods in a rural area of Thailand. Journal of Biosocial Science 10(2): 209-216. April 1978.

485. SPEIDEL, J.J. Steroidal contraception in the 80's: the role of current and new products.* Presented at the Symposium on Oral Contraception: What are the Medical and Legal Ramifications?, New York, June 24, 1981. 37 p. (To be published in the Journal of Reproductive Medicine.)

486. SPELLACY, W.N., MCLEOD, A.G.W., BUHI, W.C., and BIRK, S.A. The effects of medroxyprogesterone acetate on carbohydrate metabolism: measurements of glucose, insulin, and growth hormone after twelve months' use. Fertility and Sterility 23(4): 239-244. April 1972.

487. STADEL, B.V. Oral contraceptives and cardiovascular disease. Pt. 1. New England Journal of Medicine 305(11): 612-618. September 10, 1981.

488. STADEL, B.V. Oral contraceptives and cardiovascular disease. [Pt. 2]. New England Journal of Medicine 305(12): 672-677. September 17, 1981.

489. STADEL, B.V. [Testimony] In: United States. Food and Drug Administration. Proceedings of the Depo-Provera Public Board of Inquiry, [Washington, D.C.], January 11, 1983 Vol. 2. Arlington, Virginia, TIW Reporting Group, 1983. p. 58-74.

490. STANCZYK, F.Z. and ZEREGA, G.S. DI. Mechanisms of action of reproductive hormones. In: Mishell, D.R., Jr. and Davajan, V., eds. Reproductive endocrinology, infertility and contraception. Philadelphia, F.A. Davis, 1979. p. 21-37.

491. STENSON, B. [Swedish International Development Authority (SIDA)] [SIDA policy on provision of Depo-Provera] Personal communication, April 2, 1982. 1 p.

492. STRYKER, J.C. Use of hormones in women over forty. Clinical Obstetrics and Gynecology 20(1): 155-164. March 1977.

493. STURDEE, D.W., WADE-EVANS, T., PATERSON, M.E.L., THOM, M., and STUDD, J.W.W. Relations between bleeding pattern, edometrial histology, and oestrogen treatment in menopausal women. British Medical Journal 1(6127): 1575-1577. June 17, 1978.

*494. SWEDEN. NATIONAL BOARD OF HEALTH AND WELFARE. Decision concerning extension of the indications for the registered pharmaceutical specialties Depo-Provera suspension for injection 50 mg/ml and 150 mg/ml. September 11, 1981. 16 p. (Unpublished)

495. SWENSON, I., KHAN, A.R., and JAHAN, F.A. A randomized, single blind comparative trial of norethindrone enanthate and depo-medroxyprogesterone acetate in Bangladesh. Contraception 21(3): 207-215. March 1980.

496. TAKKAR, D., JEYASEELAN, S., KINRA, G., LAUMAS, K.R., and HINGORANI, V. Endometrial histology and progesterone levels in women using norethindrone acetate implants for contraception. Contraception 17(2): 103-113. February 1978.

497. TANKEYOON, M., DUSITSIN, N., POSHYACHINDA, V., and LARSSON-COHN, U. A study of glucose tolerance, serum transaminase and lipids in women using depot-medroxyprogesterone acetate and a combination-type oral contraceptive. Contraception 14(2): 199-214. August 1976.

498. TATUM, H.J., COUTINHO, E.M., FILHO, J.A., and SANT'ANNA, A.R.S. Acceptability of long-term contraceptive steroid administration in humans by subcutaneous Silastic capsules. American Journal of Obstetrics and Gynecology 105(7): 1139-1143. December 1, 1969.

499. TEJUJA, S. Use of subcutaneous Silastic capsules for long-term steroid contraception. American Journal of Obstetrics and Gynecology 107(6): 954-957. July 15, 1970.

500. TEJUJA, S., CHOUDHURY, S.D., SAXENA, N.C., MALHOTRA, U., and BHINDER, G. Clinical experience in India with a once-a-month oral contraceptive pill: quingestanol and quinestrol. Contraception 10(4): 375-383. October 1974.

501. TEJUJA, S., MALHOTRA, U., and BHINDER, G. A preliminary report on the contraceptive use of subdermal implants containing norethindrone. Contraception 10(4): 361-374. October 1974.

*502. TEMPLE, R.J. [Testimony] In: United States. Food and Drug Administration. Proceedings of the Depo-Provera Public Board of Inquiry, [Washington, D.C.], January 11, 1983 Vol. 2. Arlington, Virginia, TIW Reporting Group, 1983. p. 5-24.

503. TENHAEFF, D. Hormonanalytische Untersuchungen unter Behandlung mit neuartigen Kontrazeptiva. [Hormone analytic studies during therapy with new contraceptive agents.] [GER] Geburtshilfe und Frauenheilkunde 31: 760-767. August 1971.

504. THOM, M.H., WHITE, P.J., WILLIAMS, R.M., STURDEE, D.W., PATERSON, M.E.L., WADE-EVANS, T., and STUDD, J.W.W. Prevention and treatment of endometrial disease in climacteric women receiving oestrogen therapy. Lancet 2(8140): 455-457. September 1, 1979.

505. TICE, T. [Southern Research Institute, Birmingham, Alabama] [Development of biodegradable microcapsules] Personal communication, January 6, 1983.

506. TIETZE, C. and LEWIT, S. Evaluation of intrauterine devices: ninth progress report of the Cooperative Statistical Program. Studies in Family Planning 55: 1-40. July 1970.

507. TAKKANEN, M.J., NIKKILÄ, E.A., KUUSI, T., and SIPINEN, S. Different effects of two progestins on plasma high density lipoprotein (HDL_2) and postheparin plasma hepatic lipase activity. Atherosclerosis 40(3-4): 365-369. November-December 1981.

508. TOIVONEN, J. Intravaginal contraception with the synthetic progestin, R2010. Contraception 20(5): 511-518. November 1979.

509. TOIVONEN, J., LÄHTEENMÄKI, P., and LUUKKAINEN, T. Bleeding and ovulation control with use of a small contraceptive vaginal ring releasing levonorgestrel and estradiol. Contraception 20(1): 11-18. July 1979.

510. TOIVONEN, J., LÄHTEENMÄKI, P., and LUUKKAINEN, T. Pituitary and gonadal function during the use of Norgestrel-estradiol vaginal rings. Contraception 18(3): 201-211. September 1978.

511. TOIVONEN, J., LÄHTEENMÄKI, P., and LUUKKAINEN, T. The use of a contraceptive vaginal ring governed by the pattern of individual uterine bleeding. Contraception 19(4): 401-409. April 1979.

512. TOPPOZADA, H.K., ABD, M. EL, LOTFY, I., ABDEL AZIZ, F., and GENEIDY, M. EL. A study of the factors affecting discontinuation of women using injectable contraceptives. Population Studies, No. 56, January-March 1981. p. 21-31.

*513. TOPPOZADA, M. The clinical use of monthly injectable contraceptive preparations. Obstetrical and Gynecological Survey 32(6): 335-347. June 1977.

514. TOPPOZADA, M., ONSY, F.A., FARES, E., AMIR, S., and SHAALA, S. The protective influence of progestogen only contraception against vaginal moniliasis. Contraception 20(2): 99-103. August 1979.

515. TRINIDAD AND TOBAGO. CENTRAL STATISTICAL OFFICE. Trinidad and Tobago fertility survey 1977: country report: Vol. 2. [Tables] Port of Spain, Central Statistical Office, 1981. (World Fertility Survey) 597 p.

516. TSAKOK, F.H.M., KOH, S., YUEN, R., and RATNAM, S.S. Coagulation studies in Asian women using injectable progestogen for contraception. International Journal of Gynaecology and Obstetrics 18(2): 105-108. September-October 1980.

517. TSENG, L. and GURPIDE, E. Effects of progestins on estradiol receptor levels in human endometrium. Journal of Clinical Endocrinology and Metabolism 41(2): 402-404. August 1975.

518. TUTTLE, S. and TURKINGTON, V.E. Effects of medroxyprogesterone acetate on carbohydrate metabolism. Obstetrics and Gynecology 43(5): 685-692. May 1974.

519. TYLER, E.T. A contraceptive injection study employing medroxyprogesterone acetate suspension. In: Israel Academy of Sciences and Humanities. Selected papers on anti-fertility agents: reprinted from proceedings of the Sixth World Congress on Fertility and Sterility, Tel Aviv, 1968. Jerusalem, Israel Academy of Sciences and Humanities, 1970. p. 1-6.

520. TYLER, E.T., LEVIN, M., ELLIOT, J., and DOLMAN, H. Present status of injectable contraceptives: results of seven years study. Fertility and Sterility 21(6): 469-481. June 1970.

*521. UNITED STATES. CONGRESS. HOUSE OF REPRESENTATIVES. SELECT COMMITTEE ON POPULATION. The Depo-Provera debate: hearings, August 8-10, 1978. Washington, D.C., U.S. Government Printing Office, 1978. 794 p.

522. UNITED STATES. DEPARTMENT OF STATE. Population: over ten million Indonesians now using family planning. Unclassified telegram from American Embassy, Jakarta, Indonesia, to Secretary of State, Washington, D.C., March 1983. 1 p.

523. UNITED STATES. FOOD AND DRUG ADMINISTRATION. BUREAU OF DRUGS. FERTILITY AND MATERNAL HEALTH DRUGS ADVISORY COMMITTEE. [Discussion during meeting to consider animal testing requirements for new parenteral formulations of previously approved oral progestagens.] October 29, 1982. (Unpublished)

524. UNITED STATES. FOOD AND DRUG ADMINISTRATION (US FDA). BUREAU OF DRUGS. OBSTETRICS AND GYNECOLOGY ADVISORY COMMITTEE and US FDA. BUREAU OF DRUGS. BIOMETRIC AND EPIDEMIOLOGICAL METHODOLOGY ADVISORY COMMITTEES. Open session: Depo-Provera, injectable, as a contraceptive: report to the committee. December 1975. 32 p. (Unpublished)

525. UNITED STATES. FOOD AND DRUG ADMINISTRATION (US FDA). OBSTETRICS AND GYNECOLOGY DEVICE CLASSIFICATION PANEL and US FDA. OBSTETRICS AND GYNECOLOGY DRUG ADVISORY COMMITTEE. Second report on intrauterine contraceptive devices. Washington, D.C., U.S. Government Printing Office, December 1978. 102 p.

526. UNITED STATES. INTERAGENCY REGULATORY LIAISON GROUP. WORK GROUP ON RISK ASSESSMENT. Scientific bases for identification of potential carcinogens and estimation of risks. Journal of the National Cancer Institute 63(1): 242-268. July 1979.

*527. UPJOHN COMPANY. Depo-Provera for contraception: information for Public Board of Inquiry on Depo-Provera: responses to the Board's questions. (Submitted to the US Food and Drug Administration Public Board of Inquiry) FDA Docket No. 78N-0124. Kalamazoo, Michigan, Upjohn, June 25, 1982. 155 p.

528. UPJOHN COMPANY. Depo-Provera: issue discussion paper. Kalamazoo, Michigan, Upjohn Company, [1981]. 13 p. (Mimeo)

529. VALERIO, M.G. Review of microscopic slides of monkey mammary nodules and uterine tumors from a ten-year Depo-Provera study. April 1979. 6 p. (Unpublished)

530. VECCHIO, T.J. Injectable medroxyprogesterone acetate contraception: metabolic and endocrine effects. Journal of Reproductive Medicine 10(4): 193-196. April 1973.

531. VECCHIO, T.J. "Those wretched beagles." Kalamazoo, Michigan, Upjohn International, October 1973. (Depo-Provera Research Newsletter No. 7) 5 p.

532. VENEZUELA. OFICINA CENTRAL DE ESTADISTICA E INFORMATICA. and WORLD FERTILITY SURVEY. Encuesta nacional de fecundidad: Venezuela 1977: apéndice estadístico. [National fertility survey: Venezuela 1977: statistical appendix.] [SPA] Caracas, Oficina Central de Estadística e Informática, 1980. 799 p.

533. VERMEULEN, A. and THIERY, M. Hormonal contraceptives and carbohydrate tolerance: 2. Influence of medroxyprogesterone acetate and chronic oral contraceptives. Diabetologia 10(4): 253-259. August 1974.

534. VESSEY, M.P., DOLL, R., JONES, K., MCPHERSON, K., and YEATES, D. An epidemiological study of oral contraceptives and breast cancer. British Medical Journal 1(6180): 1755-1758. June 30, 1979.

535. VICTOR, A., EDQVIST, L.-E., VINDBERG, P., ELAMSSON, K., and JOHANSSON, E.D.B. Peripheral plasma levels of d-norgestrel in women after oral administration of d-norgestrel and when using intravaginal rings impregnated with dl-norgestrel. Contraception 12(3): 261-278. September 1975.

536. VICTOR, A., JACKANICZ, T.M., and JOHANSSON, E.D.B. Vaginal progesterone for contraception. Fertility and Sterility 30(6): 631-635. December 1978.

537. VICTOR, A. and JOHANSSON, E.D.B. Contraceptive rings: self-administered treatment governed by bleeding. Contraception 16(2): 137-147. August 1977.

538. VICTOR, A. and JOHANSSON, E.D.B. Plasma levels of d-norgestrel and ovarian function in women using intravaginal rings impregnated with dl-norgestrel for several cycles. Contraception 14(2): 215-226. August 1976.

539. VICTOR, A., NASH, H.A., JACKANICZ, T.M., and JOHANSSON, E.D.B. Collagen bands: a new vaginal delivery system for contraceptive steroids. Contraception 16(2): 125-135. August 1977.

540. VIINIKKA, L., VICTOR, A., JÄNNE, O., and RAYNAUD, J.-P. The plasma concentration of a synthetic progestin, R 2323, released from polysilastic vaginal rings. Contraception 12(3): 309-316. 1975.

541. VIRUTAMASEN, P., NITICHAI, Y., TANGKEOW, P., KANKEERATI, W., RIENPRAYURA, D., and BOONSIRI, B. A clinical and metabolic study of norethisterone oenanthate in Thai women. Contraception 22(4): 397-408. October 1980.

542. VISARIA, L. Family planning and marriage 1970-1980. [Table] Washington, D.C., Population Reference Bureau, [1980]. 1 p.

543. WALKER, J. [Alza Corporation] [Prices for Progestasert IUD] Personal communication, March 2, 1982.

544. WALLACH, E.E., GARCIA, C.-R., PERLOFF, R., and CLARKE, B.B. Contraception with an intramuscular estrogen-progestogen preparation administered monthly. Contraception 1(3): 185-207. March 1970.

545. WAN, L.S., HSU, Y.-C., GANGULY, M., and BIGELOW, B. Effects of the Progestasert on the menstrual pattern, ovarian steroids and endometrium. Contraception 16(4): 417-433. October 1977.

546. WANG, C. and YEUNG, K.K. Use of low-dosage oral cyproterone acetate as a male contraceptive. Contraception 21(3): 245-272. March 1980.

547. WARNER-LAMBERT PHARMACEUTICAL CO. [Research on once-a-month oral contraceptives containing quingestanol acetate] Personal communication, November 15, 1982.

548. WARWICK, D. Contraceptives in the Third World. Hastings Center Report 5(4): 9-12. August 1975.

549. WEINER, E. and JOHANSSON, E.D.B. Contraception with d-norgestrel Silastic rods: plasma levels of d-norgestrel and influence on the ovarian function. Contraception 14(5): 551-562. November 1976.

550. WEINER, E. and JOHANSSON, E.D.B. The influence of norethisterone oenanthate on ovarian function. Acta Endocrinologica 83(2): 386-392. October 1976.

551. WEINER, E. and JOHANSSON, E.D.B. Plasma levels of d-norgestrel, estradiol and progesterone during treatment with silastic implants containing d-norgestrel. Contraception 14(1): 81-92. July 1976.

552. WEINER, E. and JOHANSSON, E.D.B. Plasma levels of norethindrone after I.M. injection of 200 mg norethindrone enanthate. Contraception 11(4): 419-425. April 1975.

553. WEINER, E., JOHANSSON, E.D.B., and WIDE, L. Inhibition of the positive feedback of oestradiol during treatment with subcutaneous implants of d-norgestrel. Contraception 13(3): 287-297. March 1976.

554. WEINER, E., VICTOR, A., and JOHANSSON, E.D.B. Plasma levels of d-norgestrel after oral administration. Contraception 14(5): 563-570. November 1976.

555. WEISS, N.S. and SAYVETZ, T.A. Incidence of endometrial cancer in relation to the use of oral contraceptives. New England Journal of Medicine 302(10): 551-554. March 6, 1980.

556. WERAWATGOOMPA, S., PONGPRADIT, T., LEEPIPATPAIBOON, S., and SUKANTHANAK, A. Radioimmunoassay for serum medroxyprogesterone acetate in Thai women receiving injectable DMPA contraceptive. Contraception 20(4): 319-327. October 1979.

557. WERAWATGOOMPA, S., VAIVANIJKUL, B., LEEPIPATPAIBOON, S., CHANNIYOM, K., VIRUTAMASEN, P., and DUSITSIN, N. The effect of injectable norethisterone oenanthate on ovarian hormones in Thai women. Contraception 21(3): 299-309. March 1980.

558. WHELAN, E.M. Attitudes toward menstruation. Studies in Family Planning 6(4): 106-108. April 1975.

559. WHIGHAM, K.A.E., HOWIE, P.W., MACK, A., and PRENTICE, C.R.M. The effect of an injectable progestogen contraceptive on blood coagulation and fibrinolysis. British Journal of Obstetrics and Gynaecology 86(10): 806-809. October 1979.

560. WHITEHEAD, M.I., KING, R.J.B., MCQUEEN, J., and CAMPBELL, S. Endometrial histology and biochemistry in climacteric women during oestrogen and oestrogen/progestogen therapy. Journal of the Royal Society of Medicine 72(5): 322-327. May 1979.

561. WIEN, E.M. and OJO, O.A. Serum vitamin A, carotene and cholesterol levels in Nigerian women using various types of contraceptives. Nutrition Reports International 25(4): 687-696. April 1982.

562. WIESE, J., MARKER, I.L., HOLMA, P., VARTIAINEN, E., OSLER, M., PYÖRÄLÄ, T., JOHANSSON, E., and LUUKKAINEN, T. Long-term contraception with norethindrone subcutaneous capsules. Annals of Clinical Research 8(2): 93-97. April 1976.

563. WILBORN, W.H., FLOWERS, C.E., Jr., and HYDE, B.M. Ultrastructure of endometrium of postmenopausal patients on two models of hormonal therapy: estrone sulfate with or without MPA. Contraceptive Delivery Systems 4(1): 71-86. January 1983.

564. WILSON, J.G. Embryotoxicity of drugs in man. In: Wilson, J.G. and Fraser, F.C., eds. Handbook of teratology. New York, Plenum, 1977. p. 309-353.

*565. WILSON, J.G. and BRENT, R.L. Are female sex hormones teratogenic? American Journal of Obstetrics and Gynecology 141(5): 567-580. November 1, 1981.

566. WORLD HEALTH ORGANIZATION. A cross-cultural study of menstruation: implications for contraceptive development and use. Studies in Family Planning 12(1): 3-16. January 1981.

*567. WORLD HEALTH ORGANIZATION (WHO). The effect of female sex hormones on fetal development and infant health. Geneva, WHO, 1981. (WHO Technical Report Series No. 65) 76 p.

*568. WORLD HEALTH ORGANIZATION. Facts about injectable contraceptives. Bulletin of the World Health Organization 60(2): 199-210. 1982.

*569. WORLD HEALTH ORGANIZATION (WHO). Injectable hormonal contraceptives: technical and safety aspects. Geneva, WHO, 1982. (WHO Offset Publication No. 65) 45 p.

*570. WORLD HEALTH ORGANIZATION. EXPANDED PROGRAMME OF RESEARCH, DEVELOPMENT AND RESEARCH TRAINING IN HUMAN REPRODUCTION. TASK FORCE ON LONG ACTING SYSTEMIC AGENTS FOR THE REGULATION OF FERTILITY. Multinational comparative clinical evaluation of two long-acting injectable contraceptive steroids: norethisterone oenanthate and medroxyprogesterone acetate: 1. Use-effectiveness. Contraception 15(5): 513-533. May 1977.

*571. WORLD HEALTH ORGANIZATION. EXPANDED PROGRAMME OF RESEARCH, DEVELOPMENT AND RESEARCH TRAINING IN HUMAN REPRODUCTION. TASK FORCE ON LONG ACTING SYSTEMIC AGENTS FOR THE REGULATION OF FERTILITY. Multinational comparative clinical evaluation of two long-acting injectable contraceptive steroids: norethisterone oenanthate and medroxyprogesterone acetate: 2. Bleeding patterns and side effects. Contraception 17(5): 395-406. May 1978.

572. WORLD HEALTH ORGANIZATION (WHO). SPECIAL PROGRAMME OF RESEARCH, DEVELOPMENT AND RESEARCH TRAINING IN HUMAN REPRODUCTION. Eighth annual report. Geneva, WHO, December 1979. 126 p.

573. WORLD HEALTH ORGANIZATION. SPECIAL PROGRAMME OF RESEARCH, DEVELOPMENT AND RESEARCH TRAINING IN HUMAN REPRODUCTION. Intravaginal and intracervical devices for the delivery of fertility regulating agents. Journal of Steroid Biochemistry 11(1B): 461-467. July 1979.

*574. WORLD HEALTH ORGANIZATION. SPECIAL PROGRAMME OF RESEARCH, DEVELOPMENT AND RESEARCH TRAINING IN HUMAN REPRODUCTION. Multinational comparative clinical trial of long-acting injectable contraceptives: norethisterone enanthate given in two dosage regimens and depot-medroxyprogesterone acetate: final report. Contraception 27(4). April 1983. (In press)

575. WORLD HEALTH ORGANIZATION (WHO). SPECIAL PROGRAMME OF RESEARCH, DEVELOPMENT AND RESEARCH TRAINING IN HUMAN REPRODUCTION. Ninth annual report. Geneva, WHO, 1980. 162 p.

576. WORLD HEALTH ORGANIZATION. SPECIAL PROGRAMME OF RESEARCH, DEVELOPMENT AND RESEARCH TRAINING IN HUMAN REPRODUCTION. Safety of the long-acting injectable contraceptive Depo-Provera. October 30, 1978. 7 p. (Unpublished)

577. WORLD HEALTH ORGANIZATION. SPECIAL PROGRAMME OF RESEARCH, DEVELOPMENT AND RESEARCH TRAINING IN HUMAN REPRODUCTION. Safety of the long-acting injectable contraceptive Depo-Provera: an assessment of recent findings from a 10 year study in monkeys. June 14, 1979. 2 p. (Mimeo)

578. WORLD HEALTH ORGANIZATION (WHO). SPECIAL PROGRAMME OF RESEARCH, DEVELOPMENT AND RESEARCH TRAINING IN HUMAN REPRODUCTION. Seventh annual report. Geneva, WHO, November 1978. (HRP/78.3) 167 p.

579. WORLD HEALTH ORGANIZATION (WHO). SPECIAL PROGRAMME OF RESEARCH, DEVELOPMENT AND RESEARCH TRAINING IN HUMAN REPRODUCTION. Tenth annual report. Geneva, WHO, November 1981.

*580. WORLD HEALTH ORGANIZATION. SPECIAL PROGRAMME OF RESEARCH, DEVELOPMENT AND RESEARCH TRAINING IN HUMAN REPRODUCTION. TASK FORCE ON LONG-ACTING SYSTEMIC AGENTS FOR THE REGULATION OF FERTILITY. Multinational comparative clinical trial of long-acting injectable contraceptives: norethisterone enanthate given in two dosage regimens and depot-medroxyprogesterone acetate: a preliminary report. Contraception 25(1): 1-11. January 1982.

581. WORLD HEALTH ORGANIZATION (WHO). TASK FORCE ON PSYCHOSOCIAL RESEARCH IN FAMILY PLANNING and WHO. TASK FORCE ON SERVICE RESEARCH IN FAMILY PLANNING. User preferences for contraceptive methods in India, Korea, the Philippines, and Turkey. Studies in Family Planning 11(9-10): 267-273. September-October 1980.

582. YLÖSTALO, P., VEHASKARI, A., KAUPPILA, A., and SOTANIEMI, E. Effects of high-dose medroxyprogesterone treatment given for endometrial carcinoma on carbohydrate metabolism and liver function. Annales Chirurgiae et Gynaecologiae Fenniae 63(2): 93-98. 1974.

583. ZADOR, G., NILSSON, B.A., NILSSON, B., SJOBERG, N.-O., WESTROM, L., and WIESE, J. Clinical experience with the uterine progesterone system (Progestasert). Contraception 13(5): 559-569. May 1976.

584. ZAÑARTU, J. Long-term, contraceptive effect of injectable progestogens: inhibition and reestablishment of fertility. International Journal of Fertility 13(4): 415-426. October-December, 1968.

585. ZAÑARTU, J. A new approach to fertility control: long-acting injectable progestogens. Advances in Fertility Control 3(3): 41-43. 1968.

586. ZAÑARTU, J., AGUILERA, E., MUÑOZ, G., and PELIOWSKY, H. Effect of a long acting contraceptive progestogen on lactation. Obstetrics and Gynecology 47(2): 176-179. February 1976.

587. ZAÑARTU, J., AGUILERA, E., and MUÑOZ PINTO, G. Maintenance of lactation by means of continuous low-dose progestogen given post-partum as a contraceptive. Contraception 13(3): 313-318. March 1976.

588. ZAÑARTU, J., DABANCENS, A., RODRIGUEZ-BRAVO, R., BARSBY, F., and SCHALLY, A.V. Ovulation induction: ovarian response to human gonadotropins and synthetic gonadotropin-releasing hormone. Obstetrics and Gynecology 45(4): 443-450. April 1975.

589. ZAÑARTU, J. and NAVARRO, C. Fertility inhibition by an injectable progestogen acting for three months: a clinical survey of 130 fertile women treated with norethisterone enanthate. Obstetrics and Gynecology 31(5): 627-633. May 1968.

590. ZAÑARTU, J. and ONETTO, E. Long-acting injectable progestogens in human fertility control. In: International Planned Parenthood Federation (IPPF). South-East Asia and Oceania Regional Office. Clinical proceedings of International Planned Parenthood Federation South-East Asia & Oceania Regional Medical & Scientific Congress, Sydney, Australia, August 14-18, 1972. Colombo, Sri Lanka, IPPF Regional Office [1972]. p. 65-79.

*591. ZARFAS, D.E., FYFE, I., and GORODZINSKY, F. The utilization of Depo Provera in the Ontario government facilities for the mentally retarded: a pilot project. [Toronto, Ontario, Canada], October 1981. 152 p. (Mimeo)

592. ZARTMAN, E.R. Long-acting injectable contraception with medroxyprogesterone acetate. In: Israel Academy of Scioences and Humanities. Selected papers on anti-fertility agents: reprinted from proceedings of the Sixth World Congress on Fertility and Sterility, Tel Aviv, 1968. Jerusalem, Israel Academy of Sciences and Humanities, 1970. p. 33-40.

593. ZARTMAN, E.R. A long-acting progestational agent as a contraceptive method. In: Advances in planned parenthood: proceedings of the third and fourth annual meetings of the American Association of Planned Parenthood Physicians. Amsterdam, Excerpta Medica, 1967. (International Congress Series No. 138) p. 116-119.

*594. ZHANG, D.-W. Research activities in the field of oral contraceptives in the People's Republic of China. Acta Obstetricia et Gynecologica Scandinavica (Suppl. 105): 51-60. 1982.

ADDENDA

595. ANONYMOUS. FDA board investigates Depo-Provera safety. Contraceptive Technology Update 4(3): 25-33. March 1983.

596. ANONYMOUS. UK Depo-Provera hearing—the data, the DHSS and the public. Scrip World Pharmaceutical News, No. 745, November 15, 1982. p. 1.

597. ANONYMOUS. UK: beagle carcinogenicity studies no longer required for progestogens. Scrip World Pharmaceutical News, No. 430, October 17, 1979. p. 3.

598. ANONYMOUS. Upjohn seeks UK public hearing on D-P. Scrip World Pharmaceutical News, No. 695, May 24, 1982, p. 3.

599. ALLEN, A.C. So-called mixed tumors of the mammary gland of dog and man: with special reference to the general problem of cartilage and bone formation. Archives of Pathology 29(5): 589-624. May 1940.

600. ANTUNES, C.M.F., STOLLEY, P.D., ROSENSHEIN, N.B. DAVIES, J.L., TONASCIA, J.A., BROWN, C., BURNETT, L., RUTLEDGE, A., POKEMPNER, M., and GARCIA, R. Endometrial cancer and estrogen use: report of a large case-control study. New England Journal of Medicine 300(1): 9-13. January 4, 1979.

*601. BENAGIANO, G. and GABELNICK, H.L. Biodegradable systems for the sustained release of fertility-regulating agents. Journal of Steroid Biochemistry 11(1B): 449-455. July 1979.

602. BERLINER, V.S. and SOBEL, S. [US Food and Drug Administration (US FDA)] [US FDA policy concerning rat breast tumors and progestins] Personal communication. March 14, 1983.

603. BLYE, R. [National Institute of Child Health and Human Development] [Estimated cost of clinical trials for hormonal contraceptives] Personal communication. March 22, 1983.

604. BLYE, R. [Statement]. In: United States. Food and Drug Administration. Proceedings of the Fertility and Maternal Health Drugs Advisory Committee, Rockville, Maryland, October 29, 1982. Vol. 2. [Washington, D.C.], Baker, Hames and Burkes Reporting, 1982. p. 35-56.

605. BLYTHE, J.G. and ALI, Z. Endometrial adenocarcinoma: in estrogen, oral contraceptive and nonhormone users. Gynecologic Oncology 7(2): 199-205. April 1979.

606. BRACHE, V., ALVAREZ-SANCHEZ, F., LEON, P., SCHMIDT, F., and FAUNDES, A. The effect of levonorgestrel and estrone rods on male reproductive function. Contraception 25(6): 591-603. June 1982.

607. BRENT, R. [Statement] In: United States. Food and Drug Administration. Proceedings of the Fertility and Maternal Health Drugs Advisory Committee. November 5-6, 1981. [Washington, D.C.], Baker, Hames and Burkes Reporting, 1981. p. 42-86.

608. BRINTON, L.A., VESSEY, M.P., FLAVEL, R. and EATES, D. Risk factors for benign breast disease. American Journal of Epidemiology 113(3): 203-214. March 1981.

609. CANADA. DEPARTMENT OF NATIONAL HEALTH AND WELFARE. HEALTH PROTECTION BRANCH. SPECIAL ADVISORY COMMITTEE ON REPRODUCTIVE PHYSIOLOGY. Report on Depo-Provera. Ottawa, March 3, 1982. (Mimeo)

610. CASAGRANDE, J.T., LOUIE, E.W., PIKE, M.C., ROY, S., ROSS, R.K., and HENDERSON, B.E. "Incessant ovulation" and ovarian cancer. Lancet 2(8135): 170-174. July 28, 1979.

611. COWAN, L.D., GORDIS, L., TONASCIA, J.A., and JONES, G.S. Breast cancer incidence in women with a history of progesterone deficiency. American Journal of Epidemiology 114(2): 209-217. August 1981.

612. DICKER, R.C., LAYDE, P.M., WEBSTER, L.A., WINGO, P.A., and ORY, H.W. Ovarian cancer and use of oral contraceptives. Journal of the American Medical Association 249(12): 1596-1599. March 25, 1983.

613. EICKSTEDT, K.-W. VON. [Institut für Arzneimittel des Bundesgesundheitsamtes] [Legal status of Depo-Provera and norethinderone enanthate in West Germany] Personal communication, January 14, 1983.

614. FATHALLA, M.F. Incessant ovulation—a factor in ovarian neoplasia? [Letter] Lancet 2(7716): 163. July 17, 1971.

615. GAMBRELL, R.D., Jr. The menopause: benefits and risks of estrogen-progestogen replacement therapy. Fertility and Sterility 37(4): 457-474. April 1982.

616. GREENBLATT, R.B., GAMBRELL, R.D., Jr., and STODDARD, L.D. The protective role of progesterone in the prevention of endometrial cancer. Pathology Research and Practice 174(3): 297-318. August 1982.

617. HOWARD, G., BLAIR, M., DAVIS, H., and TREACY, M. The effect of norethisterone oenanthate on the full blood count. British Journal of Family Planning 8(4): 125-129. January 1983.

618. HULKA, B.S., FOWLER, W.C., Jr., KAUFMAN, D.G., GRIMSON, R.C., GREENBERG, B.G., HOGUE, C.J.R., BERGER, G.S., and PULLIAM, C.C. Estrogen and endometrial cancer: cases and two control groups from North Carolina. American Journal of Obstetrics and Gynecology 137(1): 92-101. May 1, 1980.

619. ILLINGWORTH, D.V., WOOD, G.P., FLICKINGER, G.L., and MIKHAIL, G. Progesterone receptor of the human myometrium. Journal of Clinical Endocrinology and Metabolism 40(6): 1001-1008. 1975.

620. JELOVSEK, F.R., HAMMOND, C.B., WOODARD, B.H., DRAFFIN, R., LEE, K.L., CREASMAN, W.T., and PARKER, R.T. Risk of exogenous estrogen therapy and endometrial cancer. American Journal of Obstetrics and Gynecology 137(1): 85-91. May 1, 1980.

621. KINCH, R.A.H. Should depot medroxyprogesterone acetate be considered for additional uses? [Editorial] Canadian Medical Association Journal 127(10): 947-948. November 15, 1982.

622. LAWSON, J.B. Sickle cell disease in pregnancy. In: Lawson, J.B. and Stewart, D.B., eds. Obstetrics and gynaecology in the tropics and developing countries. London, Edward Arnold, 1967. p. 100-119.

623. LEI, H.-P. and HU, Z.-Y. The mechanisms of action of vacation pills. In: Chang, C.F., Griffin, D., and Woolman, A., eds. Recent advances in fertility regulation. Proceedings of a symposium organized by the Ministry of Public Health of the People's Republic of China and the World Health Organization's Special Programme of Research, Development and Research Training in Human Reproduction, Beijing, September 2-5, 1980. Geneva, Atar, 1981. p. 70-82.

624. LOPEZ, D.F. Clinical investigation of Noristerat as a depot contraceptive. Injectable Contraceptives Newsletter, No. 5-6, April-July 1980. p. 1-4.

625. MACMAHON, B., COLE, P., LIN, T.M., LOWE, C.R., RAVNIHAR, B., SALBER, E.J., VALAORAS, V.G., and YUSA, S. Age at first birth and breast cancer risk. Bulletin of the World Health Organization 43(2): 209-221. 1970.

626. MCGOWAN, L., PARENT, L., LEDNAR, W., and NORRIS, H.J. The woman at risk for developing ovarian cancer. Gynecologic Oncology 7(3): 325-344. June 1979.

627. MISHELL, D.R., Jr., KLETZKY, O.A., BRENNER, P.F., ROY, S., and NICOLOFF, J. The effect of contraceptive steroids on hypothalamic-pituitary function. American Journal of Obstetrics and Gynecology 128(1): 60-74. May 1, 1977.

628. MORRIS, L. Use of contraceptive prevalence surveys to evaluate maternal-child health/family planning programs. Presented at Center for Population Research, Georgetown University, Washington, D.C., December 7, 1982. 17 p.

629. MOUNT, P.M. What do we know about the causes of ovarian cancer? Contemporary Ob/Gyn 18(6): 47-55. December 1981.

630. NEWHOUSE, M.L., PEARSON, R.M., FULLERTON, J.M., BOESEN, E.A.M., and SHANNON, H.S. A case control study of carcinoma of the ovary. British Journal of Preventive and Social Medicine 31(3): 148-153. September 1977.

631. ORY, H.W., LAYDE, P.M., WEBSTER, L.A., and WINGO, P.A. Long-term oral contraceptive use and the risk of breast cancer. Journal of the American Medical Association 249(12): 1591-1595. March 25, 1983.

632. ORY, S.J., HAMMOND, C.B., YANCY, S.G., HENDREN, R.W., and PITT, C.G. The effect of a biodegradable contraceptive capsule (Capronor) containing levonorgestrel on gonadotropin, estrogen, and progesterone levels. American Journal of Obstetrics and Gynecology 145(5): 600-605. March 1, 1983.

633. POTTS, M. [Family Health International] [Endometrial cancer case follow-up in Thailand] Personal communication, March 11, 1983.

634. RICHWALD, G.A. [Testimony]. In: United States. Food and Drug Administration. Proceedings of the Depo-Provera Public Board of Inquiry, [Washington, D.C.], January 13, 1983. Vol. 4. Arlington, Virginia, TIW Reporting Group, 1983. p. 77-90.

635. ROBERTSON, D.N., SIVIN, I., NASH, H., BRAUN, J. and DINH, J. Manufacturing methods and release rates of levonorgestrel from silastic capsules, homogenous rods and covered rods in humans. 1983. (To be published by Contraception)

636. ROSENFIELD, A., MAINE, D., ROCHAT, R., SHELTON, J., and HATCHER, R.A. Depot medroxyprogesterone acetate and health, 1960-1980: what have we learned? (To be published in Journal of the American Medical Association)

637. SCHEARER, S.B. Monetary and health costs of contraception. In: Determinants of fertility in developing countries: a summary of knowledge. (To be published by Academic Press)

638. SENANAYAKE, P. [International Planned Parenthood Federation views on Depo-Provera: statement, August 8, 1978] In: United States. Ninety-fifth Congress. House of Representatives. Select Committee on Population. The Depo-Provera debate: hearings, August 8-10, 1978. Washington, D.C., U.S. Government Printing Office, 1978. p. 327-333.

639. SIDMAN, K.R., STEBER, W.D., and BURG, A.W. A biodegradable drug delivery system. In: Gabelnick, H.L., ed. Drug delivery systems: proceedings of a workshop sponsored by Contraceptive Development Branch, Center for Population Research, National Institute of Child Health and Human Development, Bethesda, Maryland, August 2-3, 1976. Bethesda, Maryland, U.S. Department of Health, Education and Welfare, 1977. (NIH 77-1238) p. 121-140.

640. STADEL, B. [Center for Population Research, US National Institute of Child Health and Human Development] [Costs of case-control studies] Personal communication, March 23, 1983.

641. UNITED NATIONS FUND FOR POPULATION ACTIVITIES. Allocation for contraceptives. [Tables] April 1982. 63 p. (Unpublished)

642. UNITED STATES. FOOD AND DRUG ADMINISTRATION. Responses from the Food and Drug Administration to requests made by members of the Select Committee on Population. In: United States. Ninety-fifth Congress. House of Representatives. Select Committee on Population. The Depo-Provera debate: hearings, August 8-10, 1978. Washington, D.C., U.S. Government Printing Office, 1978. p. 350-408.

643. WEISS, N.S. and SAYVETZ, T.A. Incidence of endometrial cancer in relation to the use of oral contraceptives. New England Journal of Medicine 302(10): 551-554. March 6, 1980.

644. WILLETT, W.C., BAIN, C., HENNEKENS, C.H., ROSNER, B., and SPEIZER, F.E. Oral contraceptives and risk of ovarian cancer. Cancer 48(8): 1684-1687. October 15, 1981.

645. WISEMAN, R. Cases of cardiovascular defects/hormone exposure from Heinonen et al. 1977. [1982]. 3 p. (Unpublished)

*646. WORLD HEALTH ORGANIZATION (WHO). [Report of WHO consultation on monkey studies] Personal communication, February 28, 1983.

*647. WORLD HEALTH ORGANIZATION. [Testimony]. In: United States. Food and Drug Administration. Proceedings of the Depo-Provera Public Board of Inquiry, [Washington, D.C.], January 12, 1983. Vol. 3. Arlington, Virginia, TIW Reporting Group, 1983. p. 7-40.

648. WORLD HEALTH ORGANIZATION (WHO). [WHO studies of hormonal contraceptives] Personal communication, February 7, 1983.

649. ZAJICEK, J. Prevention of ovarian cystomas by inhibition of ovulation: a new concept. Journal of Reproductive Medicine 20(2): 114. February 1978.

ISSN 0097-9104

POPLINE

POPLINE, a computerized literature search service, offers bibliographic citations and abstracts on any specific subject or field of interest from a collection of more than 100,000 documents covering all aspects of family planning and population. **In developing countries**, searches can be obtained **free of charge** by writing to either of the organizations listed below. **In the United States**, users can subscribe to **POPLINE** through the National Library of Medicine (NLM), Bethesda, MD 20209. **POPLINE** is already available at over 1,800 institutions designated as search centers of the NLM MEDLARS system. **In other developed countries**, searches can be obtained through MEDLARS search centers or, in countries with no access to MEDLARS, through either of the institutions listed below. In developed countries, searches are free to persons employed by international development and training institutions; others may be charged.

POPLINE is produced by the Population Information Program of the Johns Hopkins University, the Library/Information Program of the Center for Population and Family Health of Columbia University, and *Population Index* of Princeton University, in cooperation with the US National Library of Medicine and with financial support primarily from the US Agency for International Development and also from the National Institute of Child Health and Human Development.

To request a search, please complete the following form:

Search topic: ____________________

Last name: ____________________ First name: ____________________

Organization: ____________________

Address: ____________________

City: ____________________ Postal Code: __________ Country: __________

Mail this form to either
of these addresses: ⟶
Services to
developing countries
free of charge.

Population Information Program
Attn: POPLINE
The Johns Hopkins University
624 North Broadway
Baltimore, Maryland 21205, USA

Center for Population and Family Health
Attn: POPLINE
Columbia University
60 Haven Avenue
New York, New York 10032, USA

RECENT POPULATION REPORTS

ORAL CONTRACEPTIVES—Series A

____A-5, OCs—Update on Usage, Safety, and Side Effects *(A, F, P, S)*

____A-6, Oral Contraceptives in the 1980s *(F, P, S)*

INTRAUTERINE DEVICES—Series B

____B-3, IUDs—Update on Safety, Effectiveness, and Research *(F, P, S)*

____B-4, IUDs: An Appropriate Choice for Many Women

STERILIZATION, FEMALE—Series C

____C-8, Reversing Female Sterilization *(F, P, S)*

LAW AND POLICY—Series E

____E-6, Legal Trends and Issues in Voluntary Sterilization *(F, P, S)*

BARRIER METHODS—Series H

____H-5, Spermicides—Simplicity and Safety Are Major Assets *(F, P, S)*

____H-6, Update on Condoms—Products, Protection, Promotion

PERIODIC ABSTINENCE—Series I

____I-3, Periodic Abstinence: How Well Do New Approaches Work? *(F, P, S)*

FAMILY PLANNING PROGRAMS—Series J

____J-19, Community-Based and Commercial Contraceptive Distribution *(A, F, P, S)*

____J-20, Filling Family Planning Gaps *(F, P, S)*

____J-21, Social Marketing: Does It Work? *(F, P, S)*

____J-22, Traditional Midwives and Family Planning *(F, P, S)*

____J-23, Films for Family Planning Programs *(F, P, S)*

____J-24, Breast-Feeding, Fertility, and Family Planning *(F, P, S)*

____J-25, Population and Birth Planning in the People's Republic of China *(F, P, S)*

____J-26, Sources of Population and Family Planning Assistance

INJECTABLES AND IMPLANTS—Series K

____K-2, Long-Acting Progestins—Promise and Prospects

ISSUES IN WORLD HEALTH—Series L

____L-1, Tobacco—Hazards to Health and Human Reproduction *(A, F, P, S)*

____L-2, Oral Rehydration Therapy for Childhood Diarrhea *(A, F, P, S)*

____L-3, Community-Based Health and Family Planning

SPECIAL TOPICS—Series M

____M-2, Voluntary Sterilization: World's Leading Contraceptive Method *(A, F, P, S)*

____M-3, The World Fertility Survey—Current Status and Findings *(A, F, P, S)*

____M-4, Age at Marriage and Fertility *(F, P, S)*

____M-5, Contraceptive Prevalence Surveys: A New Source of Family Planning Data *(F, P, S)*

____M-6, Population Education in the Schools *(F, P, S)*

INDEX

____Index 1972–1977 (to English edition only)

____Index 1978–1980 (to English edition only)

Population Information Program
The Johns Hopkins University
624 North Broadway, Baltimore, Maryland 21205, USA

1. Recent **Population Reports** are listed above. Check (✓) the issues you want to order in the spaces provided. **Population Reports** are free in any quantity to developing countries. In USA and other developed countries, multiple copies are $.50 each; full set of reports in print, $20.00; with binder, $25.00. Send payment in US$ with order.
2. All publications appear in English. Many are available in Arabic, French, Portuguese, and Spanish, as the abbreviations after each title indicate. Check the language you prefer: Arabic ☐, English ☐, French ☐, Portuguese ☐, Spanish ☐
3. Please type or print your name and mailing address clearly.

Last name ____________ First name ____________

Organization ____________

Address ____________

City ____________ Postal Code ____________

Country ____________

4. Please check appropriate box or boxes:

☐ Send ______ copies of each future issue of **Population Reports.**

☐ I am already on the **Population Reports** mailing list.

☐ Please send me a binder (in developed countries, $5.00 for binder only).

☐ I do not want to receive **Population Reports** regularly.

5. Mail to address above.

8/3/83 U2520-1.24 A

Population Reports

Series L
Number 4
July 1983

ISSUES IN WORLD HEALTH

Population Information Program, The Johns Hopkins University, Hampton House, 624 North Broadway, Baltimore, Maryland 21205, USA

Infertility and Sexually Transmitted Disease: A Public Health Challenge

Editors' Summary. For men and women both, the most common preventable cause of infertility is infection. In some areas infection-related infertility is so widespread that it constitutes not only a personal problem but also a public health challenge. Pelvic inflammatory disease in women, due to sexually transmitted disease (STD) and other infections, probably accounts for more than half of all female infertility in many regions. Although the woman is usually blamed when a couple cannot have children, male factors explain about one-third of all infertility. Low sperm count, often the result of infection, is the most important male factor.

Infertility can mean either primary infertility — that is, inability to have any children at all — or secondary infertility — inability to have additional children — after several years of trying. Treatment of either primary or secondary infertility is difficult and costly, and the results uncertain. Therefore, public health programs should focus on prevention, which is much more practical and cost-effective. Programs to prevent infertility can stress:

- improved diagnosis, treatment, and control of sexually transmitted diseases,
- public education about STDs for men and women,
- expanded family planning services for men as well as women, stressing barrier methods and the pill,
- improved delivery and maternal health care.

Infertility may be most common in tropical Africa, where researchers have identified communities in which more than 30 percent of couples are childless. Infertility also occurs more often than usual in some Asian countries and in the Caribbean region. In Sudan, Indonesia, and Jamaica, for example, nationwide surveys suggest that more than 6 percent of married women reach age 40-49 without having any children. In most developing countries, 2 to 3 percent are childless. In the US the percentage of couples remaining childless is almost 8, but an unknown part of that is voluntary.

Female Infertility

The major causes of female infertility — which accounts for 50 to 70 percent of all infertility — are:

- infections and resulting damage or blockage of the fallopian tubes,
- hormonal or ovulation disorders, and
- endometriosis (growth of endometrial tissue outside the uterus).

In developed countries, hormonal disorders and endometriosis account for a large part of infertility, but they can be treated with increasing effectiveness. Drugs such as clomiphene citrate can be used to induce ovulation; drugs or surgery can be used in the early stages of endometriosis to prevent endometrial growths from damaging reproductive organs.

More common in developing countries — and most difficult to treat under any circumstances — is infertility caused by the aftereffects of various genital infections, including STDs. Infections can lead to permanent scarring and blockage of the fallopian tube, making fertilization impossible. They also can cause inflammation that disrupts sperm and egg transport. Some STDs, such as syphilis, can infect a fetus in the uterus, causing intrauterine death. Some, such as herpes, can infect the child at birth, reducing the chances for survival.

The most frequent type of infection in the fallopian tubes is pelvic inflammatory disease (PID). The term PID is now widely used to describe infections that have ascended into the upper reproductive tract. The most frequent cause of PID is gonorrhea. Gonorrhea can spread rapidly through populations and produces few immediate symptoms in the female. Therefore it is likely to go untreated, spread to

CONTENTS

Extent of the Problem L-114
Female Infertility, PID, and Disease L-118
Pregnancy Wastage and Disease L-122
Effects of Childbirth and Illegal Abortion L-124
Other Causes of Female Infertility L-125
Male Infertility, STD, and Disease L-127
Other Causes of Male Infertility L-130
Infertility Therapy L-132
Prevention L-134
The Role of Family Planning Programs L-141
Bibliography L-144

BEST AVAILABLE COPY

This issue of Population Reports was prepared by Jacqueline D. Sherris, Ph.D., and Gordon Fox on the basis of published and unpublished materials, correspondence, and interviews. Comments and additional material are welcome.

The assistance of the following reviewers is appreciated: O.P. Arya, Stuart T. Brown, Ronald T. Burkman, Willard Cates, Jr., G.Y. Causse, Philip Corfman, John C. Cutler, Odile Frank, Ronald Gray, Robert Hatcher, John C. Hume, Louis Keith, Theodore M. King, Joseph A. McFalls, André Meheus, Malcolm Potts, Reimert T. Ravenholt, John A. Rock, Anatole Romaniuk, Allan Rosenfield, Pramilla Senanayake, J. Joseph Speidel, and R.R. Willcox. Some reviewers read portions of the manuscript; others, all.

Population Reports is designed to provide an accurate and authoritative overview of important developments in the population field. It does not represent official statements of policy by The Johns Hopkins University or the US Agency for International Development.

Phyllis T. Piotrow, Ph.D., Director; Walter W. Stender, Associate Director; Ward Rinehart, Editor.

Population Reports (USPS 063-150) is published bimonthly (January, March, May, July, September, November) at 624 North Broadway, Baltimore, Maryland 21205, USA, by the Population Information Program of The Johns Hopkins University and is supported by the United States Agency for International Development. Second class postage paid at Baltimore, Maryland. Postmaster to send address changes to **Population Reports**, Population Information Program, The Johns Hopkins University, 624 North Broadway, Baltimore, Maryland 21205, USA.

the tubes, and cause infertility. Other infections that can lead to tubal infertility are *Chlamydia* and possibly mycoplasmas — both sexually transmitted.

Childbirth and abortion can be major sources of infections that cause infertility. Infection is especially likely when these events take place under unhygienic conditions involving untrained personnel and when women with complications cannot reach hospitals. Women who have cervical or vaginal infections at the time are also at high risk.

Male Infertility

Much less is known about male infertility, partly because men are less likely to seek full examination or treatment. Male infertility results primarily from low concentrations of sperm in semen (low sperm count) or abnormal sperm. In developing countries male infertility, like tubal infertility in women, is often caused by untreated genital infections, many of them sexually transmitted. These infections may persist for years, spread through the reproductive organs, and cause inflammation and scarring that can block sperm transport. The same STDs that cause female infertility — especially gonorrhea, chlamydial infection, and possibly mycoplasmas—also affect males.

Prevention

Clearly, the most effective approach in the long run is to prevent the spread of infections that lead to infertility. Public health programs that would contribute to this goal include:

- *STD control programs.* These require individual and institutional efforts to identify and treat all STD cases as rapidly and effectively as possible, thus checking the spread of disease and its later complications.
- *STD education programs.* An important part of any control program, these involve public education of men and women at greatest risk to be sure that they know about the causes, symptoms, and dangers of STDs, and how and where to obtain treatment. Emphasis can be placed on the fact that limiting the number of sexual contacts will reduce the chances of acquiring an STD and possibly becoming infertile.
- *Training programs for traditional midwives.* These can teach those who attend childbirth and provide female health care how to reduce the risk of infection during uncomplicated births and when to refer women to health centers for further attention.
- *Basic family planning services.* Family planning programs can promote use of condoms, spermicides, diaphragms, and oral contraceptives — all of which protect against infections that can lead to infertility. Family planning can reduce the incidence of induced abortion by making contraceptives readily available and educating people about proper use.
- *Expanded family planning, STD, and/or basic infertility services.* In addition to promoting appropriate contraceptives, these programs can help to identify and treat STDs and can help infertile couples obtain an initial evaluation of their condition at minimal cost.

Much of infertility is preventable, especially where rates of infertility are high because of disease. But controlling sexually transmitted disease and promoting the use of appropriate contraceptives require a sustained public health effort with national political support. This effort must emphasize the shared responsibility of men and women, since infertility is a shared problem. It will not be solved without appropriate and responsible behavior by both sexes and concerted, long-term efforts by health care providers. **End of Editors' Summary.**

EXTENT OF THE PROBLEM

The extent of infertility varies considerably among countries and within countries. Couples everywhere, however, are distressed if they are unable to produce the offspring they want, and particularly if they are childless. Some may find their lives significantly disrupted by infertility. In many cultures the ability to have children is an important sign of an individual's worth. Couples want sons, who can inherit their land and name. They want children to care for them in old age and, in some religions, to pray for them after their death. For women, failure to have children can lead to social disgrace and divorce (499). While the social and psychological consequences of infertility differ, in virtually every culture most people feel that it is important to have children (343, 398).

National Data

Demographic studies usually measure infertility in one of two ways:

(1) childlessness at the end of reproductive life or
(2) the absence of recent live births or pregnancies.

On the extent of childlessness, the most comprehensive national data come from the World Fertility Survey (WFS) (625) (see **Population Reports**, *The World Fertility Survey: Current Status and Findings*, M-3, July 1979). Overall, in the mid to late 1970s levels of childlessness among married women age 40 to 49 ranged from 1.3 percent in South Korea to 6.7 percent in Indonesia. The average for all 27 surveyed countries was 3.4 percent. The percentage was above this average in two of four African countries surveyed — Lesotho, at 5.5 percent, and Sudan, at 6.3 percent. Among 10 Asian and Pacific countries, childlessness was above the average in only two, Fiji, at 4.3 percent, and Indonesia. In 4 of 11 Latin American and Caribbean countries, childlessness was high — between 4.5 and 6.5 percent. These countries were the Dominican Republic, Guyana, Jamaica, and Trinidad and Tobago, all in the Caribbean region. In both Middle Eastern countries surveyed, Jordan and Syria, levels of childlessness were below 3 percent (see Table 1).

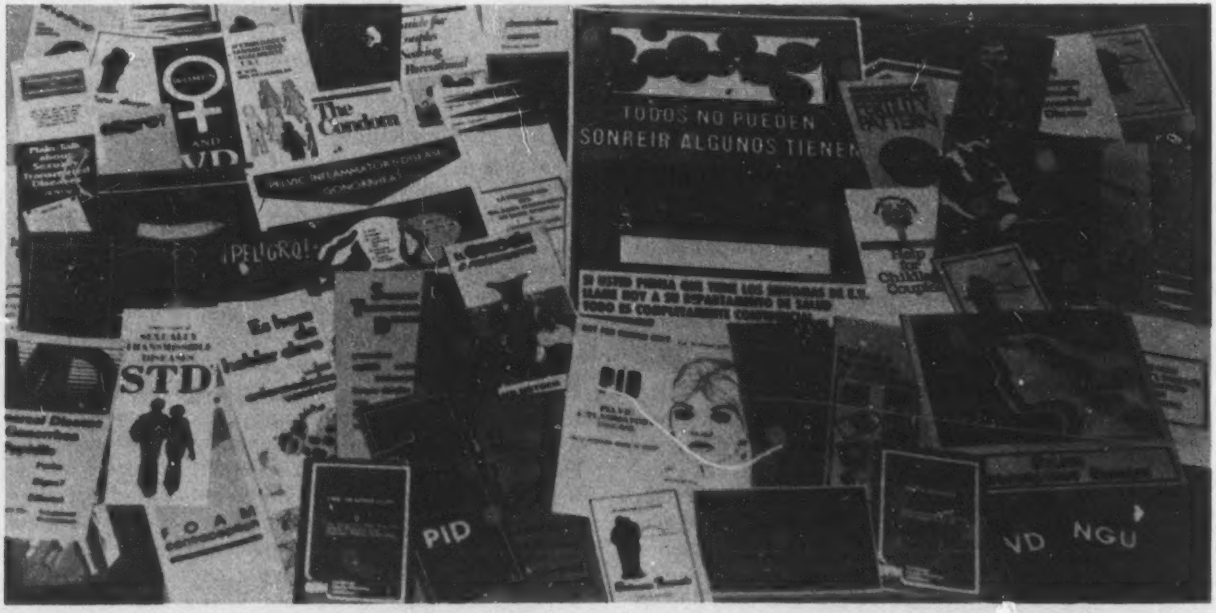
WFS data have definite limitations for studying infertility, however. First, they reflect the experience of currently married women only. If some women are divorced because they are childless, the actual extent of childlessness is underestimated. Also, national data may obscure substantial regional differences within some countries. A further shortcoming of data on childlessness is that they do not cover couples who become infertile after having one or more children. Where childlessness is common, however, secondary infertility usually is also common (170).

Census data also have identified countries where childlessness is relatively common. African censuses in the 1950s and 1960s found that childlessness among women age 50 and older reached 32 percent in Gabon, 18 percent in Zaire, 14 percent in the Central African Republic, and 10 percent in Sudan (56). More recently, in the US 7.7 percent of ever-married women age 45 to 49 were childless in 1980 (620). It is not known how much of US childlessness is voluntary, however.

Table 1. Percentage of Women Age 40-49, Continuously Married for at Least Five Years, Who Are Childless, World Fertility Survey Reports, 1974-1979

Place	Date	Number of Women Surveyed	% Childless
AFRICA			
Kenya	1977-78	1,079	2.7
Lesotho	1977	587	5.5
Senegal	1978	622	3.1
Sudan	1978	478	6.3
ASIA & PACIFIC			
Bangladesh	1975-76	826	2.2
Fiji	1977	955	4.3
Indonesia	1976	1,728	6.7
Korea, Rep. of	1974	1,285	1.3
Malaysia	1974	1,461	2.7
Nepal	1976	988	3.1
Pakistan	1975	990	2.8
Philippines	1978	2,390	2.1
Sri Lanka	1975	1,661	2.8
Thailand	1975	906	2.3
LATIN AMERICA & CARIBBEAN			
Colombia	1976	620	2.9
Costa Rica	1976	648	2.2
Dominican Republic	1975	334	4.5
Guyana	1975	663	5.3
Haiti	1977	412	3.2
Jamaica	1975-76	511	6.5
Mexico	1976-77	1,188	3.5
Panama	1976	601	2.7
Paraguay	1979	627	3.2
Peru	1977-78	1,294	2.0
Trinidad & Tobago	1977	648	4.9
MIDDLE EAST			
Jordan	1976	722	2.2
Syria	1978	970	2.9

Source: Vaessen, M. [World Fertility Survey] (625)



Educational materials publicize three important ways to guard against infertility: (1) prevent and treat pelvic inflammatory disease (PID), a major source of infertility in women; (2) prevent and treat sexually transmitted diseases (STDs), which lead to PID and pregnancy loss in women and cause infertility in men as well; (3) use contraceptives such as condoms or spermicides, which protect against STDs, or the pill, which protects against PID. Programs in family planning, primary health, and STD control all have roles to play in preventing infertility.

What Is Infertility?

Infertility is defined in various ways. Medical, demographic, and popular usages often differ. A useful definition in assessing the need for public health programs, in planning medical treatment services, and in talking with couples is the inability to conceive, impregnate, or carry a pregnancy to term.

Definitions of infertility are often based on a couple's experience trying to achieve pregnancy over a period of time. From a medical point of view, a couple is considered possibly infertile if pregnancy has not occurred within one or two years of unprotected intercourse (671). Demographic studies often define a couple as infertile if the woman reports no pregnancies or live births within a certain number of years of unprotected intercourse — usually the past one, two, or five years. US and UK studies substantiate these definitions. A US study found that over 90 percent of couples desiring pregnancy achieved pregnancy within one year; 96 percent, within two years (606). A UK study of women stopping contraception to become pregnant found that over 90 percent had a child within two years; 96 percent, within three years (629).

A number of terms are commonly used in discussions of infertility. *Infecundity* is the inability to conceive or to impregnate. In medical literature the term infecundity often is synonymous with infertility. For instance, the World Health Organization (WHO) defines infertility as the inability to achieve conception within two years (671). *Pregnancy wastage* is the failure to carry a pregnancy to term, including both spontaneous abortion at any stage of pregnancy and stillbirth (671). *Primary infertility* means a couple has never achieved conception. *Secondary infertility* means at least one conception has occurred, but the couple is currently not able to achieve pregnancy (671). In popular use, the terms primary and secondary infertility also include the inability to carry a pregnancy to term. *Sterility* implies complete and permanent inability to conceive or impregnate, even after treatment (55). *Childlessness* — a common measure of infertility — means that a couple has not produced any children, whether due to infecundity, pregnancy wastage, contraception, or induced abortion (55). While demographers distinguish between fertility, as childbearing performance, and fecundity, as childbearing ability, this report follows medical and popular usage, which equates the two.

A second measure of infertility is the percentage of married women who have not had a child or a pregnancy for a certain number of years, even though they were not using any contraception. By this measure, WFS data show especially high levels of infertility in Africa and in certain Asian countries (see Figure 1). This measure, however, may exaggerate the extent of infertility where women practice prolonged breastfeeding and/or postpartum abstinence. Also, this type of measure covers not just pathological infertility but also the normal decline in female fertility that accompanies age (see box, p. L-124).

In some countries levels of infertility are high enough to have a noticeable effect on total fertility, or average size of a completed family. According to a recent estimate, in 17 African countries taken together, infertility reduces total fertility by an average of one birth per woman, from 7.3 to 6.3. Where infertility is very common, as in Gabon, total fertility may be reduced by as much as 3.2 births per woman, from 7.3 to 4.1 (170). It has been suggested that infertility has been an important reason for decreases in population size in certain areas of Africa (495, 501). Among the Fulani of North Cameroon, infertility is thought to be responsible for a birth rate that is lower than the death rate (143). Many areas of declining population where infertility is a problem also are affected by out-migration, endemic disease, and high rates of child mortality (209, 392, 492, 626). Thus it is difficult to determine the effect of infertility without birth rates and other data.

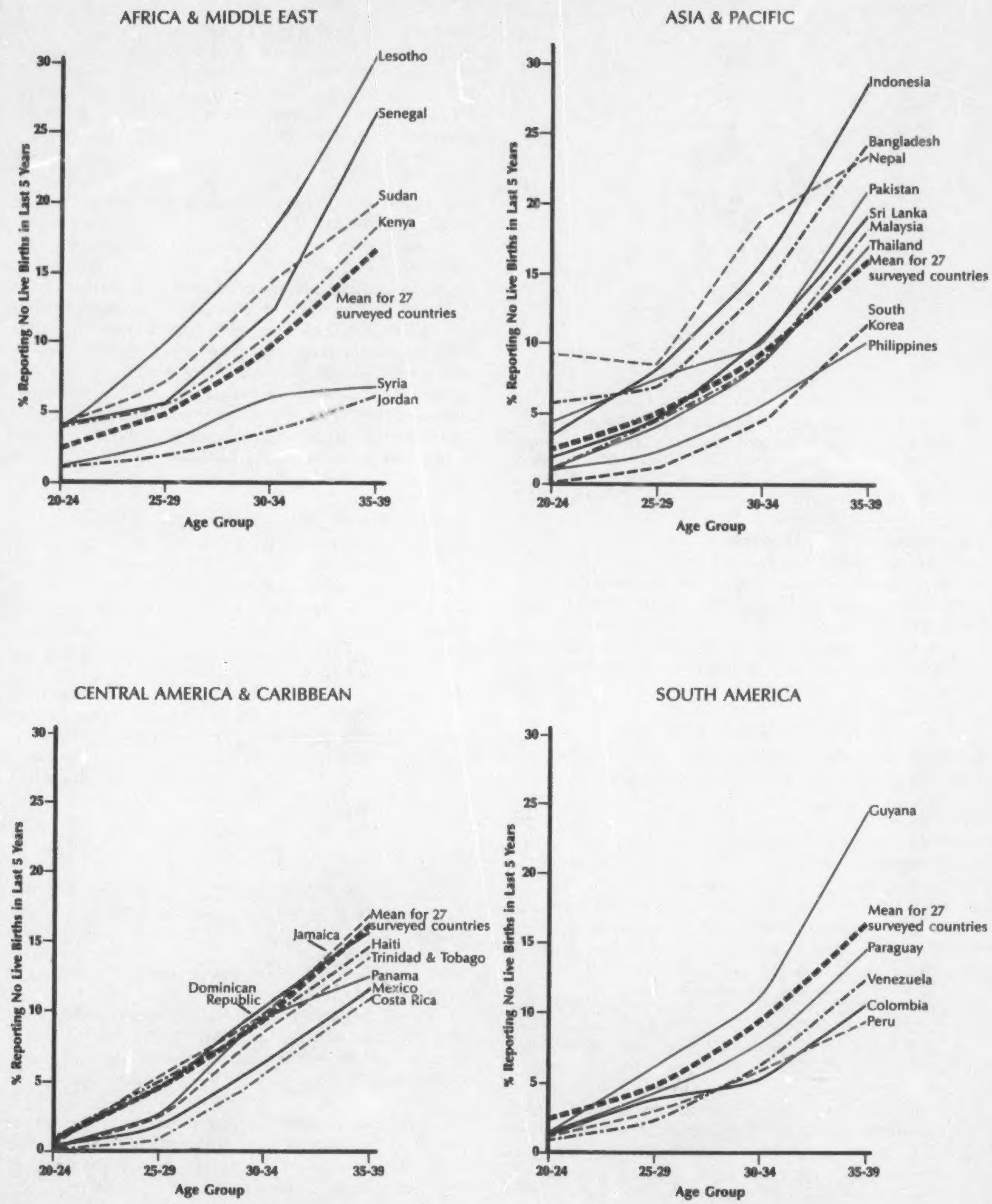
Regional Variation

Within many countries levels of childlessness vary widely among regions (327, 495). In Africa research on the causes of infertility has been conducted for over 30 years, resulting in a large body of demographic, sociologic, and anthropologic literature (495). This research has uncovered areas with very high levels of infertility. In some regions of the Central African Republic in the late 1950s, for instance, as many as 40 percent of women age 45 and older had never given birth to a live infant (496, 498, 499). Among Upper Voltan villages studied by Anne Retel-Laurentin, the average number of live births reported by women age 45 and older varied from 2.1 to 4.6, and childlessness varied from 11 to 25 percent (30, 494). STDs and other diseases are thought to account for most of the infertility: where STDs were more common, rates of infertility were high (492, 494, 500, 501).

Data from other countries also show marked regional differences in infertility. According to African censuses from the 1950s and 1960s, among women age 50 and older childlessness varied by region from 3 to 40 percent in Zaire, 2 to 21 percent in Sudan, 18 to 46 percent in Gabon, and 10 to 19 percent in the Central African Republic (56). In Tanzania a 1973 survey found that childlessness among women age 40 to 44 ranged from 4 percent in one region to 21 percent in another (226). In Cameroon a recent study of women age 15 to 50 found that primary infertility — never having conceived — varied between 3 and 17 percent among regions. Secondary infertility varied between 14 and 39 percent (313). In Indonesia in the mid-1970s, 6.7 percent of married women age 40 to 49 were childless (625), but in some regions 15 percent of married women age 30 and over were childless (245).

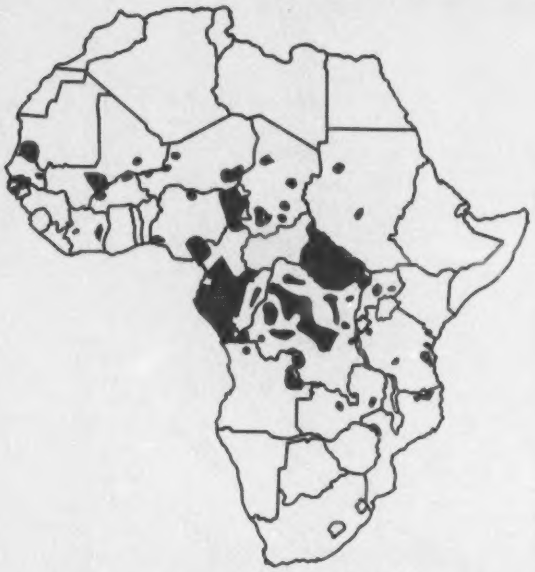
Ethnic and racial differences in infertility have been observed in places as disparate as Zaire and the US. In Equateur Province, Zaire, for example, childlessness among women age 45 to 49 varies from about 6 percent among the Ngbaka and Batwa-Batshwa peoples to 65 percent among the Mbelo (530). In the US a 1976 survey showed that about twice as many noncontracepting black couples as white couples had not achieved pregnancy in the previous year — 18.4 percent compared with 9.1 percent (404). Levels of infertility may differ because of differences in the prevalence of STDs or because of differences in access to adequate care for STDs and during childbirth.

Figure 1. Percentage of Noncontracepting, Nonpregnant Women, Continuously Married for Last Five Years, Reporting No Live Births in Last Five Years, by Age Group, World Fertility Survey Reports, 1974-1979



Source: Vaessen, M. [World Fertility Survey] (625)

Areas of Infertility in Africa



Throughout tropical Africa — especially in the central region — areas where infertility is common have been identified through numerous medical, demographic, and anthropologic studies. (Adapted from Retel-Laurentin, A. Infécondité en Afrique noire: maladies et conséquences sociales. Paris, Masson, 1974.)

Childlessness is more common in cities than rural areas wherever the pattern has been studied — among women of various age groups in Indonesia (245), Kenya (407), Niger (141), Tanzania (73), and Zaire (516, 596). This may be because STDs are more common in cities (36). In cities the presence of recently arrived, unmarried migrants and the disruption of traditional family units contribute to the spread of STDs (27, 60, 628).

Effect of Marriage Patterns

Infertility often is relatively common in areas where marriages tend to be unstable and where many people have multiple sexual partners (495). Marital instability, premarital intercourse, and brief consensual unions — all of which may increase the number of sexual partners — can lead to infertility by facilitating the spread of STDs (143, 498, 515). At the same time, marital instability may be the result of infertility (437). In some societies women are divorced because of childlessness, or women leave infertile marriages hoping to conceive with a new partner (143, 436, 499).

Polygyny (more than one wife) may increase the likelihood of infertility (233, 437, 495, 517), probably because STDs can be transmitted quickly among all wives in a polygynous marriage. At the same time, where polygyny exists, lack of offspring with one wife may encourage a man to take other wives (437). A 1977 Kenyan survey found that, among women age 45 to 49, 6 percent of co-wives were childless, while only 2 percent of sole wives were childless (226). Women in polygynous marriages may have coitus less often, which also could help to explain such a difference.

Trends

Is infertility becoming more or less common? Data are few, so it is not possible to assess worldwide trends. Zaire and the US, however, are contrasting examples. In Zaire, childlessness appears to have declined substantially. Between 1955-58 and 1975-76 the percentage of women age 25 to 34 who were childless declined in all nine provinces surveyed. In some provinces the declines were dramatic: from 20 to 4 percent in Lulua, from 39 to 10 percent in Equateur, and from 42 to 13 percent in Tshuapa. These declines have been attributed to massive penicillin campaigns in the 1940s and 1950s to prevent and treat STDs (515, 516, 596, 597). These data suggest that infertility may be declining in parts of Africa and elsewhere as STD treatment becomes more common.

In the US, by contrast, survey data suggest that infertility among young married women increased slightly between 1965 and 1976 (405). Infertility, defined as no pregnancy after one or more years of intercourse without contraception, increased from 4.5 to 7.4 percent among those age 15 to 29, a statistically significant change (405). Rates of STDs and pelvic inflammatory disease (PID) increased markedly during this period (see box, p. L-131). By contrast, among older women, infertility declined from 15.5 to 12.6 percent. Methodologic problems make it difficult to be sure of the accuracy of these percentages (387), but the results agree with clinicians' observations of increasing infertility problems among young US women (154, 401). These data suggest an impact of increasing STDs on infertility even where treatment is available.

When is infertility a public health problem? There is apparently no "baseline" level of infertility or childlessness which, if exceeded, indicates that infertility is a public health problem rather than only a couple's private concern (55). Among the Hutterites, a healthy, high-fertility North American religious sect not at high risk of sexually transmitted diseases and not using contraception, only 2 to 3 percent of married women were childless at age 45 (689, 691). It is not clear, however, whether rates would be similar in other populations without STDs and contraception. Regardless of the level of childlessness or infertility, wherever preventable infections such as STDs are a major cause of infertility, public health programs can play an important role in helping couples to achieve their desired family size (56) (see pp. L-134-143).

FEMALE INFERTILITY, PID, AND DISEASE

Female factors probably account for about 50 to 70 percent of all infertility (22, 49, 401). In clinical studies female factors may be overestimated as a cause of infertility, however, because men are less likely to be examined and because unexplained infertility is often arbitrarily attributed to the female.

The immediate causes of female infertility are fairly well understood. They can involve structural or physiologic abnormalities in any part of the female reproductive tract (see Figures 2 and 3). For example:

- Ovaries may fail to produce a viable egg, preventing the possibility of conception.
- Fallopian tubes may be blocked, distorted, or infected, preventing normal movement of the egg or sperm in the tubes.

- The uterus may be distorted or the uterine lining (endometrium) inadequate or infected, preventing implantation or survival of the embryo.
- The cervix may be malformed, infected, or secrete abnormal mucus, preventing sperm from reaching the upper reproductive tract.
- Systemic infection or hormonal imbalance may result in fetal death.

In many developing areas, or wherever general health care is poor, a large proportion of female infertility is caused by tubal infection and blockage. As shown below, surveys of infertility patients indicate that tubal factors are the chief cause of female infertility in various developing countries.

Clinic Location and Ref. No.	Number of Women	% With Tubal Abnormalities
Nairobi, Kenya (368)	104	73
Libreville, Gabon (409)	228	44
Kef, Tunisia (182)	114	56
Highlands, Papua New Guinea (102)	220	86
North Sulawesi Peninsula, Indonesia (49)	634	62

Although data are few, chronic pregnancy wastage also may be more common in areas where health conditions are poor. In 1971 in regions of Upper Volta where childlessness was common, the spontaneous abortion and stillbirth rate was 31 percent — 15 to 20 percent higher than expected (494).

In developed countries, or where general health care is adequate, the major causes of female infertility, in addition to tubal damage, are ovulation disorders and complications of endometriosis (see Table 2). (Endometriosis is a condition in which endometrial tissue, like that in the uterus, grows on the ovaries, fallopian tubes, and other organs, often causing adhesions — bands of fibrous tissue that cause organs to adhere to one another abnormally.) Clinical series of infertile couples in Denmark, Israel, the US, and Singapore suggest that ovulation disorders account for about 20 to 30 percent of female infertility; tubal problems, for about 15 to 25 percent; and endometriosis, for 10 to 15 percent. (The distinction between endometriosis and tubal problems is not always clear since endometriosis may cause tubal obstruction.) In 10 to 20 percent of couples, neither a male nor a female cause for infertility can be found (see Table 2). Clinical series such as those shown in Table 2 often reflect the specialties of clinics, differing diagnostic techniques, the motivation of couples to attend the clinic, their ability to pay, and other factors (55, 274, 693). Thus these reports may not be precise indications of the causes of infertility.

Figure 2. Relationships of Selected Direct and Indirect Causes of Female Infertility

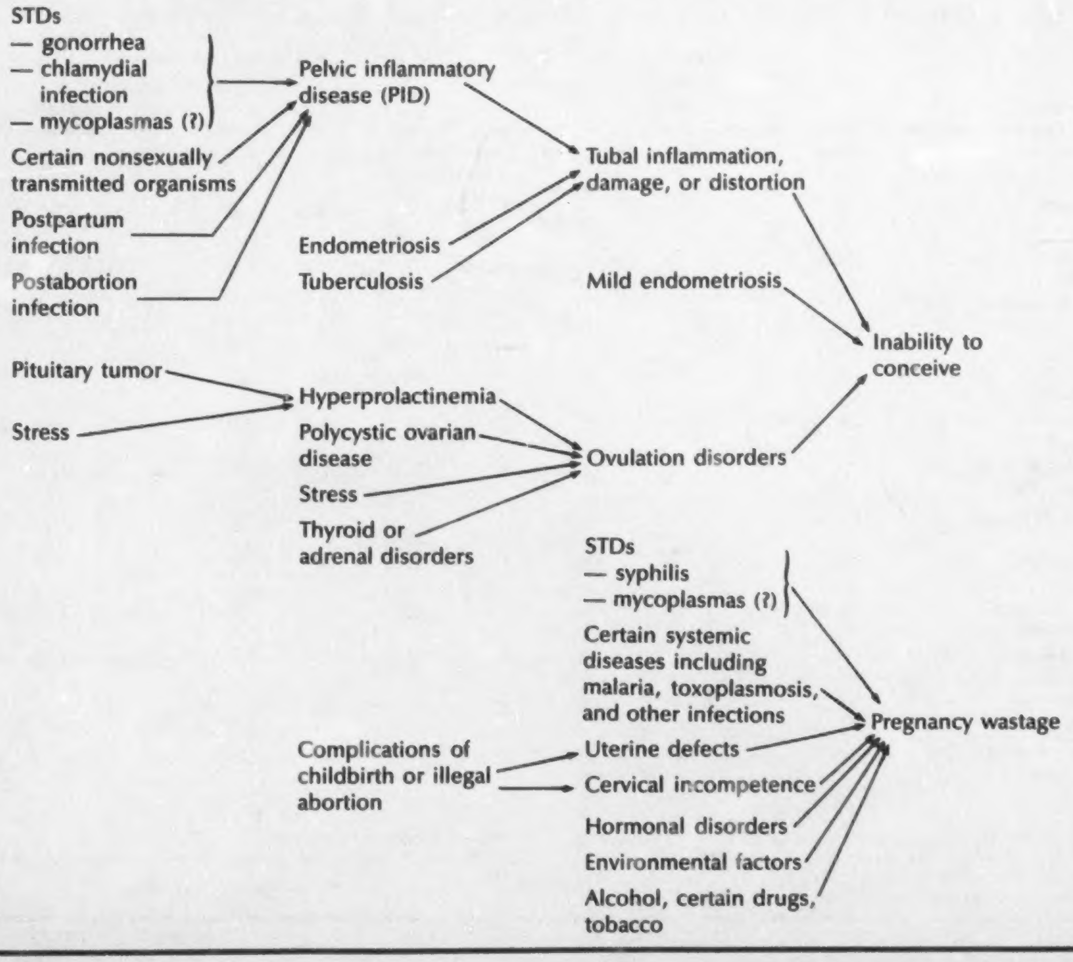
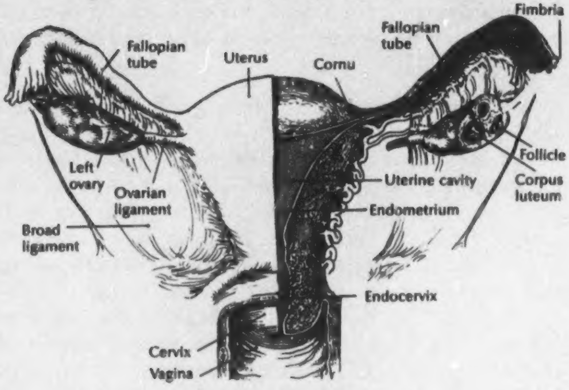

STDs
— gonorrhea
— chlamydial infection
— mycoplasmas (?)
Pelvic inflammatory disease (PID)
Certain nonsexually transmitted organisms
Postpartum infection
Postabortion infection
Tubal inflammation, damage, or distortion
Endometriosis
Tuberculosis
Mild endometriosis
Inability to conceive
Pituitary tumor
Stress
Hyperprolactinemia
Polycystic ovarian disease
Stress
Thyroid or adrenal disorders
Ovulation disorders
STDs
— syphilis
— mycoplasmas (?)
Certain systemic diseases including malaria, toxoplasmosis, and other infections
Complications of childbirth or illegal abortion
Uterine defects
Cervical incompetence
Hormonal disorders
Environmental factors
Alcohol, certain drugs, tobacco
Pregnancy wastage

Figure 3. The Female Reproductive Tract



Pelvic Inflammatory Disease

The major cause of tubal blockage leading to infertility is pelvic inflammatory disease (PID) — an infection often originating in the cervix that ascends to the upper reproductive tract. Women with PID are infertile during the infection. Also, PID can lead to fluid-filled swellings, adhesions, scarring, and other permanent damage to the fallopian tubes (367). In general, a woman with PID is more likely to become permanently infertile if the disease is severe, if treatment is delayed, or if she has suffered multiple episodes of PID. In developed countries an estimated 15 to 20 percent of women who develop PID become permanently infertile (648, 649, 651). In developing countries the proportion probably is higher, since women with PID are less likely to be treated. Before antibiotics were available, an estimated 60 percent of PID cases may have led to infertility (649).

Lars Weström in Lund, Sweden, has documented the links between PID and infertility. Some 900 women treated for acute PID between 1960 and 1974 were followed to their first pregnancy or, if not pregnant, until 1979. Overall, 15 percent of the former PID patients who were at risk of pregnancy never became pregnant. Of the women who had had severe PID (as diagnosed by laparoscopy), 30 percent were infertile, compared with 13 percent with moderate PID and 6 percent with mild PID. Also, the more episodes of PID, the greater the risk of infertility (648) (see Figure 4).

Weström also has shown a link between PID and ectopic pregnancy. In an earlier study one of 24 pregnancies among 415 PID patients was ectopic compared with one of 147 among 100 controls (647). Ectopic pregnancy often leads to rupture of a fallopian tube — a life-threatening emergency that usually requires surgical removal of the tube.

The major sources of PID are:

- sexually transmitted diseases,
- postpartum infection,
- postabortion infection (410).

Table 2. Causes of Infertility in Clinical Series of Couples Seeking Treatment, Selected Studies, 1962-1980

		% of Couples with Infertility Caused by:				Causes of Female Infertility as % of All Infertility						
Author, Date, Country & Ref. No.	No. of Couples	Male Factors	Female Factors	Both Male & Female	Unknown	Tubal	Ovulation Disorders	Cervical Factors	Uterine Factors	Endo-metriosis	Multiple Female Causes	Other Causes
DEVELOPING COUNTRIES												
Barten 1978, Indonesia (49)	863[a]	30	64	NA	6	42	12	3	4	0	NA	4[b]
Chukudebelu et al. 1979, Nigeria (126)	114	48[c]	50[c]	4	2	25	12	0	7	0	NA	5
García Martínez et al. 1977, Mexico (181)	500[a]	12	87	NA	2	23	23	20	10	0	NA	10
Ledward 1980, Saudi Arabia (324)	56	20	61	5	14	9	48	2	2	0	NA	NA
Nakamura et al. 1971, Brazil (415)	919	28	67	2	2	35	10	5	13	0	NA	4
Ratnam et al. 1976, Singapore (485)	709	23	55	NA	22	12	23	0	0	15	6	0
DEVELOPED COUNTRIES												
Dor et al. 1977, Israel (150)	665	23	52	8	18	16[a]	33[a]	1[a]	4[a]	0	2[a]	1[a]
Jones & Pourmand 1962, US (261)	555[d]	15	66	4	16	21	22	4	2	12	3	3
Katayama et al. 1979, US (275)	459[d,e]	18	68	NA[e]	15	12	24	5	2	25	NA[e]	NA
Sørenson 1980, Denmark (573)	196	10	72	NA	18	27	22	0	9	0	13	0
Thomas & Forrest 1980, Australia (604)	291	6	61	10	23	5	50	0	0	2	5	NA

[a] Percentages are expressed as percentages of all diagnosed causes of infertility, not as percentages of individuals or of couples.
[b] May include some cases of male infertility.
[c] Includes couples also listed under "Both Male & Female."
[d] All are primary infertility cases.
[e] Excludes 177 couples with multiple causes of infertility not specified by sex

Among the STDs, gonorrhea and chlamydial infections are the most common causes of PID-related infertility (see Table 3). Other factors that increase the risk of PID are dilation of the cervix, which occurs during childbirth or induced abortion, and use of an IUD, especially among women exposed to STDs (211) (see p. L-124).

Sexually Transmitted Diseases

Gonorrhea. Worldwide, gonorrhea is almost certainly the most common preventable cause of PID and tubal infertility (see box, p. L-131). Caused by the bacteria *Neisseria gonorrhoeae*, gonorrhea is highly contagious through sexual contact. The chances of a man's acquiring gonorrhea from a single exposure are between 20 and 35 percent (672); for a woman the chances are probably double those for a man (91). Because individuals never develop protective immunity, the disease can spread rapidly through a population. In women cervical gonorrhea is often asymptomatic. Thus women are much less likely to seek treatment than men, who usually notice a burning sensation at urination and urethral discharge within a week after infection (37). An estimated 8 to 20 percent of women with untreated cervical gonorrhea develop gonococcal PID (161, 293, 652). The risk depends largely on how quickly the disease is treated.

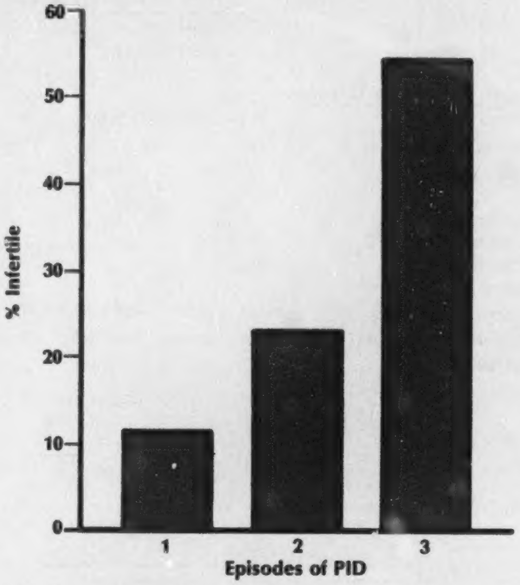
Gonococcal PID — defined as PID in women who also have cervical gonorrhea (136) — can produce severe clinical symptoms, but it usually responds quickly to antibiotics. The symptoms include abdominal pain, tenderness of the fallopian tubes, fever, and vaginal discharge of pus (136, 284, 591, 593). Where adequate medical facilities are available, most women with these symptoms probably seek treatment quickly and thus decrease the risk of permanent tubal damage.

When gonococcal PID is not treated, the disease can be very damaging. The bacteria multiply rapidly in tubal tissue (106) but after a week or two appear to die out. Then a variety of secondary invaders — usually bacteria that ascend from the vagina — may infect the damaged tissue (134, 359, 400). These often cause more damage than the initial gonococcal infection (190, 359, 593), since many are difficult to treat.

In some developed and developing countries, gonorrhea causes more than 40 percent of PID cases. In the US between 40 and 50 percent of women with PID have positive endocervical gonorrhea cultures (131, 134, 161, 594). Similar figures are reported in Africa. In Uganda a study of 86 PID patients found that at least 38 percent had cervical gonorrhea (204). In a Kenyan study 43 percent of 53 PID patients had gonorrhea (108), and in Zambia a study found that 46 of 100 PID patients had gonorrhea (484). Gonorrhea is not always a major cause of PID, however. In India, where gonorrhea does not appear to be widespread, only 9 percent of 800 PID patients had gonorrhea (549).

A comparison of two regions in Uganda suggests a close association between high levels of gonorrhea and PID, on one hand, and infertility, on the other. In one region, Teso, 18 percent of women had positive cultures for gonorrhea, 17 percent of women had evidence of PID, and the birth rate was relatively low — 37 births per 1,000 population annually. In the other region, Ankole, 2 percent of women had positive cultures for gonorrhea, none had PID symptoms, and the birth rate was high — 55 per 1,000 population annually (39).

Figure 4. Percentage of Women Infertile, by Number of Episodes of Pelvic Inflammatory Disease, Lund, Sweden



Source: Weström, L. Incidence, prevalence and trends of acute pelvic inflammatory disease and its consequences in industrialized countries. American Journal of Obstetrics and Gynecology 138(7, Pt. 2): 880-892. December 1, 1980.

Chlamydial infections. Another common sexually transmitted disease that can cause tubal infertility is chlamydial infection. It is caused by a bacteria-like organism, *Chlamydia trachomatis*, that lives within the cells of its host (533, 536). In women, infection results in cervicitis. A recent study in Sweden found that 8 percent of women with cervical chlamydial infections had PID (652).

In general, the symptoms of chlamydial PID are less severe than those of gonococcal PID. Many women may be asymptomatic (210, 591, 650). Yet the tubal damage caused by chlamydial PID appears to equal or exceed that caused by gonococcal PID (397). In Weström's study of 415 PID patients, women with nongonococcal PID, including chlamydial PID, were almost four times more likely to be infertile than women with gonococcal PID. Other factors also may have contributed to this difference, however (647).

It is difficult to gauge the incidence of chlamydial PID, mainly because the disease-causing organism is difficult to culture (673) and also because other STDs often mask its effects (650). In Swedish, Finnish, and US clinics where tests for the organism are routine, 20 to 30 percent of PID patients have chlamydial infections (161, 362, 452). Very little information on chlamydial infections is available from developing countries.

Infertile women often have evidence of current or past chlamydial infection. In the US 35 percent of 172 infertile women had high chlamydial antibody titers; 75 percent of the women with high titers were infertile because of tubal

Table 3. Summary of Relationships Between Female Infertility and Diseases in Developing Countries

	Inability to Conceive		Pregnancy Wastage	
Disease	Cause/Effect Relationship	Epidemiologic Importance	Cause/Effect Relationship	Epidemiologic Importance
Sexually Transmitted Diseases				
Gonorrhea	Yes—well-established	Major	No	None
Chlamydial infections	Yes—few data	Unknown	No	None
Syphilis	No	None	Yes—well-established	Possibly great where disease is common
Mycoplasmas				
M. hominis	Possible	Unknown	No	None
U. urealyticum	No	None	Possible	Unknown
Other Conditions				
Postpartum infection	Yes—well-established	Probably major	No	None
Postabortion infection	Yes—well-established	Probably major	No	None
Tuberculosis	Yes—well-established	Unknown	No	None
Malaria	No	None	Possible—few data	Probably great where disease is common
Toxoplasmosis	No	None	Yes	Unknown
Schistosomiasis	Possible—few data	Unknown	No	None

Source: adapted from Belsey, M.A. The epidemiology of infertility: a review with particular reference to sub-Saharan Africa. Bulletin of the World Health Organization 54(3): 319-341. 1976. See text, pp. L-121-124, for further references and discussion.

problems (268). In Finland 57 percent of 128 infertile women had such antibodies, compared with 29 percent of 68 pregnant women. The highest antibody levels were found in 9 infertile women with proven tubal blockages (475).

Mycoplasmas. These sexually transmitted organisms are commonly found in the human reproductive tract (598). Some studies have found that women with PID are more likely than controls to harbor one type of mycoplasma — *Mycoplasma hominis* (161, 364). Mycoplasma infections often coincide with gonococcal or other infections (161, 364). Thus it is not clear whether they damage tubal tissue or merely coexist with other infections known to be damaging.

Other Diseases

Genital tuberculosis. Genital tuberculosis (TB) usually develops after an infection in the lungs (165, 537, 665) and causes scarring and adhesions that can block the tubes (284). Little is known about the prevalence of genital TB or about the proportion of women with pulmonary TB who develop genital TB. Genital TB generally is asymptomatic. Signs and symptoms of tubal disease, such as bleeding and pain, may occur many years after the initial infection, if they occur at all (165, 286, 434, 537). Thus, women often are unaware that they have genital TB until they try to have children. Even endometrial biopsies may fail to detect the disease in about half of the cases (665).

In India, where pulmonary TB is common (668), genital TB may cause about 10 percent of female infertility. Among women undergoing curettage or endometrial biopsy for infertility, genital TB has been found in 4 to 6 percent (157, 454, 549). Laparoscopic examinations, which identify more cases, found that 11 percent of over 500 infertile Indian women had genital TB (296, 297).

Schistosomiasis. A number of researchers have suggested that schistosomiasis (also called bilharziasis or snail-fever), a water-borne parasitic disease common in many developing countries, may be another cause of tubal infertility (96, 354, 408, 681). It has also been suggested that schistosomiasis causes pregnancy wastage. Retel-Laurentin observed that, in regions of the Central African Republic and Upper Volta where infertility is common, the rate of spontaneous abortion or stillbirth was 30 to 40 percent for women with urogenital schistosomiasis but no STDs, compared with 5 to 20 percent in women with neither schistosomiasis nor STDs (492, 493, 497).

How schistosomiasis would cause infertility is not clear, however (95, 184, 423, 639). A variety of mechanisms have been proposed — all related to the presence of schistosome eggs in the genital tract (352, 353, 354, 681). Only a small portion of women with schistosomiasis, however, have schistosome eggs in the genital tract, and damage is usually minimal (74, 119, 158, 186). Controlled studies to date have failed to link infertility or ectopic pregnancy to schistosomiasis (74, 177, 186).

PREGNANCY WASTAGE AND DISEASE

Pregnancy wastage is common. As many as 45 percent of all pregnancies may be lost before women even recognize that they are pregnant (159, 172, 228). About 15 percent of recognized pregnancies end in spontaneous abortion (316, 511). Most of these pregnancy losses result from unpreventable, random genetic or developmental abnormalities of the fetus that are incompatible with life. Other unpreventable causes include malformed uterus or cervix and inadequate production of the hormone progesterone, which is necessary to maintain pregnancy (287, 511). (See Figure 2.) Among the most important preventable causes of pregnancy wastage are:

- STDs
- certain systemic diseases and infections.

Syphilis and Other STDs

Syphilis is an important preventable cause of pregnancy wastage in some countries. Caused by the spirochete *Treponema pallidum*, syphilis can progress from a primary stage, characterized by a painless genital chancre, to a secondary stage, characterized by a general body rash, to a latent stage that may last for years before the serious systemic effects of tertiary syphilis, such as insanity and heart disease, occur. Pregnancies in women with primary and secondary syphilis often end in spontaneous abortion, stillbirth, perinatal death, or the birth of a child with congenital syphilis (293). For instance, a US study in the late 1940s and early 1950s found that, among 220 pregnancies in women with untreated primary or secondary syphilis, 38 percent ended in spontaneous abortion, stillbirth, or neonatal death; 41 percent resulted in a syphilitic infant. By contrast, of 82 women with late syphilis, when the disease is much less infectious, 74 percent delivered healthy, full-term infants (252).

Syphilis was a serious problem throughout much of the world before penicillin became widely available in the mid-1950s (662). Scattered reports of a high incidence of congenital syphilis suggest that it remains a serious problem in a number of African countries including Cameroon, the Central African Republic, Senegal, Uganda, Upper Volta, Zaire, and Zambia (293, 497), and in some parts of Asia (see box, p. L-131).

How much impact does syphilis have on the fertility of a population? In some regions of the Central African Republic in the late 1950s and early 1960s the syphilis rate among married women was about 50 percent. Some 40 percent of women age 45 and older in these regions were childless, and women in this noncontracepting population had an average of only two children (496, 498).

In a major study in Upper Volta, Retel-Laurentin documented in 1971 that fertility was lowest where syphilis rates were highest, and vice versa (30, 494).

	Region		
	High-Fertility	Medium-Fertility	Low-Fertility
Syphilis rate (% of women age 35-49)	11%	26%	36%
Birthrate (per 1,000 population)	236	166	134
Childlessness rate (% of women age 15+)	11%	22%	25%
Abortion and stillbirth rate (% of pregnancies)	22%	24%	31%

In these regions all identified syphilis cases and their contacts were treated in 1971 and again in 1976. Between 1971 and 1976 syphilis rates dropped by about 5 percent in each of the regions. Fertility rates increased in all three regions — to 266 in the high-fertility region, 226 in the medium-fertility region, and 201 in the low-fertility region (30). The pregnancy wastage rate for the period 1972 to 1976 dropped slightly to an overall 24 percent for the three regions (30). A variety of other diseases also were common in the regions (497). WHO researchers have suggested that the fertility differences in these regions may have been due more to gonorrhea than to syphilis or other diseases (56). Syphilis and gonorrhea often occur in the same populations (250).

Mycoplasma infections. Infections of the endometrium with the mycoplasma *Ureaplasma urealyticum* are thought to cause pregnancy wastage (173), but the evidence is not clear. Abnormally high rates of spontaneous abortion have been observed among women with these infections (2, 173, 477). Also, the infections appear to be more common among infertile couples (175, 194, 305, 588). Moreover, there have been reports that treating infertile women for mycoplasma infections improved their chances of pregnancy (174, 477, 588). A well-controlled double-blind trial did not confirm this, however (218). Also, mycoplasmas are present in nearly half of all sexually active adults (599), the majority of whom have no fertility problems.

Genital herpes. The main risk of a genital herpes infection to a pregnant woman is that her infant may contract herpes during birth. An infant has a 50 percent chance of acquiring the infection if born while herpes in the mother is in one of its periodic active stages. Of infants that become infected, 60 percent die (293). Herpes infections also can be transmitted to a developing fetus (557, 663), but only when the virus is circulating through a woman's bloodstream. This happens only during the first episode of herpes, not during later episodes (577).

Other Diseases

Malaria. Experience with malaria control programs suggests that malaria is an important cause of spontaneous abortion. For example, in Sri Lanka before malaria control, the birth rate dropped markedly in the months after the peak of the malaria season. After malaria control the distribution of births was more uniform (424). How would malaria cause abortion? Low birth weights indicate that malarial infection of the placenta can impair fetal nutrition (29, 94, 103, 344, 378). Impaired fetal nutrition is assumed to increase the risk of abortion as well as the risk of low birth weight (201). High fever in early pregnancy also could cause abortion (201, 373). Even if malaria only slightly increases the risk of abortion, it could cause much pregnancy wastage in some areas because it is so common.

Toxoplasmosis. Toxoplasmosis may be an important cause of abortion in women who have an acute episode during

This swollen fallopian tube is distorted by adhesions (arrow). Adhesions can be caused by infection, endometriosis or surgical trauma. Only careful surgery can remove them. (Courtesy of John Rock) pregnancy. Transmitted mainly through cat feces and raw meat, toxoplasmosis may produce mild, transient fever, fatigue, enlarged lymph nodes, and, in severe cases, extensive damage to the brain, eyes, muscles, heart, liver, or lungs. In some cases the fetus is infected through the placental blood supply.

In many countries toxoplasmosis is a common cause of fetal death. In Zaire a 1970 study suggested that toxoplasmosis may have caused about 10 percent of stillbirths (644). It is estimated to cause more than 10 percent of pregnancy wastage in southern India (449). Surviving infants may suffer defects such as blindness and mental retardation. Since immunity generally develops after infection (56, 340, 509, 667), toxoplasmosis does not cause habitual abortion (191, 283, 310, 574).

Many other common infectious diseases, when contracted early in pregnancy, can cause high fever or fetal infection, resulting in abortion. These diseases include influenza, pneumonia, scarlet fever, and rickettsiae (56, 318, 474, 520, 547). While the risk to an exposed pregnancy can be great, there is no danger to subsequent pregnancies after the disease episode (474, 520).

EFFECTS OF CHILDBIRTH AND ILLEGAL ABORTION

Postpartum and postabortion infections are common in many parts of the world. If untreated, these infections can spread to the tubes, sometimes causing tubal infertility. In

Age and Female Infertility

Biologically, a woman's reproductive life begins at menarche and ends at menopause. Demographically, fertility rates are measured in terms of women age 15 to 44 or sometimes 49. In fact, a woman's natural fecundity varies considerably over the years between menarche and menopause. It is low immediately after menarche and before menopause, when hormonal patterns may be quite irregular. It probably peaks between ages 18 and 30.

At what age does the risk of infertility significantly increase? Interest in this question has developed mainly because many women, especially educated women with professional careers, are delaying childbearing — sometimes even until their 30s.

Clearly, sexually active women's risk of infertility increases with age partly because they have more time to develop PID, to have an induced abortion leading to complications, or to develop other reproductive health problems (220, 617). It is generally believed as well that women's fertility declines considerably even before menopause because the ova produced are more often defective, and therefore pregnancy wastage is more common. Also, ovulation becomes less frequent. A marked drop in fertility has been thought to occur at about age 35 (462).

A recent French study strongly suggested that women's fertility drops sharply at around age 30 rather than at age 35 (167). Over 2,000 nulliparous women whose husbands were azoospermic were surveyed after undergoing artificial insemination by donor, mostly with frozen sperm. Failure to conceive after one year of monthly inseminations was much more common in women over age 30 than in younger women (167):

Age	% Failing to Conceive
≤ 30	26
31-35	39
36 +	46

Some physicians have concluded from these data that women thinking about delaying childbearing until their late 20s or early 30s should be warned of an increasing risk of infertility (144).

John Bongaarts of the Population Council has challenged this conclusion. He argues that artificial insemination with frozen sperm produces fewer conceptions than natural sexual unions, and thus natural fertility is much greater than indicated by the French study (76). In addition, Bongaarts cites data on natural fertility showing that fertility does not drop substantially until age 35 (76, 77). Bongaarts calculated age-specific female infertility rates using data from 25 17th and 18th century French communities and from an early 20th century Hutterite society — none of which would have been affected by abortion, contraception, or many other factors that might obscure natural fertility. Infertile women were those who did not give birth in a 5-year interval. The rates by age were:

Age	% Infertile
20-24	4.0
25-29	5.5
30-34	9.4
35-39	20.0

In general, World Fertility Survey data also suggest that the risk of infertility increases more sharply at ages 35-39 than at any younger age (see Figure 1, p. L-117). In most of the 27 countries surveyed, the increase in the percentage of continuously married women with no live births in five years was substantially greater between the age groups of 30-34 and 35-39 than between 25-29 and 30-34. In about one-fourth of the countries, however, the risk of infertility increased steadily beginning at age 30 (625). US data for 1976 also show a gradual increase in infertility with age rather than a sharp increase at any specific age (405).

The controversy over the exact relationship between female infertility and age has not yet been settled (78, 224). It is clear that the risk of infertility increases with age. Yet, as Bongaarts states, for many women who want to postpone childbearing "the risks . . . may well be quite small compared to the benefits" (76).

Uganda, for example, postabortion and postpartum infection are thought to be second only to gonorrhea as a cause of female infertility (204). Infections occur after childbirth or abortion because microorganisms ascend more easily through a cervix that is dilated. Also, tissue remaining in the uterus may promote bacterial growth. The organisms causing infection may be present in the anus or vagina normally. Also, they spread from a cervical infection or are introduced by dirty hands or instruments.

The prevalence of specific infections varies geographically. For instance, in Ethiopia 19 of 45 women with postpartum infection (42 percent) had positive gonorrhea cultures (461). In India, however, 86 percent of postpartum infections studied were caused by staphylococcal or fecal bacteria; no gonococci were found (627). Chlamydial infections also can be an important cause of postpartum and postabortion infection. In a US study women with chlamydial infections during pregnancy were 2.5 times more likely to develop postpartum infections than women without chlamydial infections (631). In a Swedish study women with endocervical chlamydial infections were over five times more likely to develop PID within four weeks after first-trimester induced abortion than uninfected women (478). The mycoplasma *M. hominis* also may cause postpartum and postabortion infections (219, 598), but its importance is unclear (372).

Postpartum Infection

Postpartum infection causes many maternal deaths in developing countries and probably leads to secondary infertility in many who survive (56, 132, 201, 373, 616, 671). In several African hospitals, for example, postpartum infection accounts for 14 to 30 percent of maternal mortality (31, 88, 100, 351, 355). In an Ethiopian hospital 10 percent of all gynecologic patients had postpartum infection (461). In a 1973 Ugandan study about 10 percent of hospital admissions for acute pelvic inflammation were due to postpartum infections (204). In a recent Indian study 16 percent of hospital admissions for chronic pelvic inflammation were due to postpartum infection (549).

Obstetric difficulties, such as prolonged or obstructed labor, generally result in more bleeding and trauma than normal labor (222) and thus more danger of infection (139, 320, 323, 469, 474, 585). Cephalopelvic disproportion (the fetal skull too large for the pelvic opening) contributes to obstructed labor and so to risk of infection. It may be more common where nutritional deficiencies early in a woman's life result in a small pelvis (205, 258, 314, 317, 320). Ritual female circumcision, common in some African and Middle Eastern countries, often causes scarring of the external genitalia. Thus the risk of tearing during childbirth and of subsequent infection may be increased (see p. L-126).

Women are at greater risk of infection, trauma, and infertility if they give birth in unsanitary conditions or without the help of trained personnel. Unskilled birth attendants may introduce microorganisms into the genital tract or may be unable to manage obstructed labor (320). Some traditional childbirth practices may even promote infection or tissue damage (222, 631). For instance, among the Yoruba of Nigeria herbs are sometimes placed in the vagina to enhance uterine contractions and hasten delivery (335). In cases of obstructed labor, stronger uterine contractions may increase the risk of uterine rupture (258, 320, 321).

Postpartum infections are a major cause of secondary infertility when childbirth occurs under conditions that are unsanitary. (Y. Pouliquen/WHO)

Postabortion Infection

Infection following induced abortion is an important cause of infertility in some countries (56, 124, 201, 229, 299, 416, 547, 671). Because abortions performed by untrained practitioners are often unsanitary or incomplete (332, 416), infection is common. A Malaysian study found signs of infection in 22 percent of abortion-related hospital admissions (561). Spontaneous abortion also may result in infection. This generally occurs only when the abortion is incomplete, and the infection usually is limited to the endometrium (474, 487). In a Bangladesh hospital study of 1,003 women admitted for incomplete abortion, 10 percent of those who had had induced abortions developed pelvic infections compared with only one percent of women who had had spontaneous abortions (52).

Improperly performed abortions also can cause physical injury leading to infertility. Uterine trauma or lacerations of the vagina or cervix can cause cervical incompetence, intrauterine adhesions, and other complications that interfere with fertility (474). Objects inserted through the cervix may perforate the uterus, leading to extensive pelvic infection (24, 332). Chemicals may destroy tissue, thus facilitating infection (323, 474, 487) and causing intrauterine adhesions (539).

OTHER CAUSES OF FEMALE INFERTILITY

A variety of other factors that may occasionally cause female infertility are relevant to public health programs because they are predictable and preventable. These include:

- alcohol, tobacco, certain drugs, and certain environmental pollutants,
- severe malnutrition,
- effects of female circumcision.

Other causes, which are not preventable, include genetic and hormonal disorders.

Alcohol, Tobacco, Drugs, and Environmental Pollutants

Alcohol. Evidence is mounting that alcohol can cause a range of fertility problems in women. Women with severe drinking problems — alcoholics — have reported difficulty conceiving. They often have a variety of health problems, however, so the direct effects of alcohol cannot be assessed (50). Moderate and heavy drinkers who become pregnant have greater risk of pregnancy loss (289), and, if they do not abort, their children may have various physical and mental problems (140, 215, 266). A recent prospective study found that pregnant women who drank more than 100 g of alcohol a week (about 10 drinks) were more likely to have babies whose weight was below the tenth percentile. The risk for these women was more than double that for women who drank about 50 g per week (676). Even in small amounts alcohol may be unsafe for pregnant women (333, 572, 624).

Tobacco. Smoking also can have an adverse effect on reproduction. Pregnant women who smoke have a greater chance of developing complications that can result in perinatal death, particularly placenta previa (a placenta that covers part or all of the cervical opening). The risks of smoking are especially marked among poorly nourished women who lack prenatal care (128). Smoking clearly increases the chances that an infant will be of low birth weight (450). Also, smoking probably increases the risk of spontaneous abortion (128, 223, 376). The more cigarettes smoked per day, the greater the risks (288). (See **Population Reports**, *Tobacco — Hazards to Health and Human Reproduction*, L-1, March 1979.)

Drugs. Certain over-the-counter, prescription, and illicit drugs may lower a woman's fecundity (430). Habitual use of barbiturates or narcotics is thought to inhibit regular ovulation (376). Some powerful drugs used to treat serious illnesses such as cancer and chronic kidney disease can stop ovulation completely (46, 280, 376). Tetracycline, often used in treatment of STDs, affects the developing bones and teeth of a fetus and so should not be taken during pregnancy. Some prescription drugs, including certain antidepressants, narcotic analgesics, and tranquilizers have been suspected of promoting congenital malformations and pregnancy wastage (84). Controlled studies to date, however, generally have not shown a clear association between these prescription drugs and effects on the fetus (271).

Environmental pollutants. Various substances used in industry and agriculture may affect a woman's fecundity (345, 374, 430). Lead poisoning both reduces the ability to conceive and increases pregnancy wastage (6, 514). Radiation and many pesticide residues also can increase pregnancy wastage (46). There is a need for more controlled studies to demonstrate whether associations exist between specific pollutants and infertility (270).

Malnutrition

Chronic malnutrition may reduce fertility somewhat by delaying menarche, reducing frequency of intercourse, and increasing susceptibility to diseases that cause infertility (75, 79, 121, 272, 373, 406). Pregnancy wastage may also be more likely (198). In general, however, the body adjusts to moderate malnutrition, and fecundity is maintained (79). Under starvation conditions, ovulation and menstruation may stop. During the Dutch famine of 1944-45, the Bangladesh famine of 1974-75, and the Kampuchean famine of 1978-79 birth rates dropped by about 50 percent. They increased nine months after food became available (234, 281, 406, 582).

Female Circumcision

Female circumcision clearly endangers the health of girls and women, but the relationship to infertility is uncertain. Practiced chiefly in certain African and Middle Eastern countries, the operation varies from excision of the tip of the clitoris to removal of the clitoris, labia minora, and labia majora — termed Pharaonic circumcision (40, 43, 373). It is generally performed on girls between the ages of 4 and 10 (43, 466). All female circumcisions involve a short-term risk of infection, hemorrhage, shock, and urine retention. Pharaonic circumcisions are especially dangerous and may cause long-term complications (43, 373, 412).

Clinicians in Sudan suspect that Pharaonic circumcision predisposes women to ascending infections and infertility. This is because scarring and closure of the external genitalia prevent proper drainage of urine and menstrual blood and because tearing, which facilitates infection, is likely to occur at childbirth (412, 525). Controlled studies of circumcision, infection, obstetric difficulties, and infertility have not been carried out, however. A Sudanese survey of the medical histories of 7,505 women, 95 percent of whom had undergone Pharaonic circumcision, found that short-term complications of the operation were common. Yet infertility was reported by only about 2 percent. It occurred in most cases because the circumcision had made full penile penetration impossible (42).

Unpreventable Infertility

Certain causes of female infertility can neither be predicted nor prevented. Some, such as ovulation disorders and endometriosis, often can be treated and corrected. Other, less common problems, such as genetic disorders that result in defective ova or repeated abortions, are not treatable (227, 552).

Ovulation disorders. In most developed countries and in some countries of Asia and the Middle East, infrequent ovulation or the absence of ovulation (anovulation) are the most common cause of female infertility (see Table 2). Usually accompanied by amenorrhea or dysmenorrhea, ovulation disorders result from disruption of the hypothalamic-pituitary-ovarian axis, the complex feedback system of hormonal signals necessary for normal menstrual cycles and the maintenance of pregnancy. Among the causes of ovulation disorders are the following:

- Hyperprolactinemia, a high serum concentration of the pituitary hormone prolactin, can inhibit ovulation, possibly by blocking various ovarian hormone receptors and thus causing a hormonal imbalance (58). Up to 40 percent of hyperprolactinemia cases may be caused by pituitary tumors (178).
- Polycystic ovarian disease — often called Stein-Leventhal syndrome — inhibits ovarian function. It is characterized by enlarged ovaries with many follicular cysts, amenorrhea, abnormal hair growth, and obesity (44, 80). Almost all women with this disease are infertile.

- Thyroid gland disorders disrupt the hypothalamic-pituitary-ovarian axis. Too much thyroid hormone results in too little circulating estrogen; too little thyroid hormone results in too much estrogen (44). In either case the normal effects of estrogen on the hypothalamus are absent, and ovulation is prevented.
- Stress may disrupt ovulation by affecting the autonomic nervous system, which in turn affects the endocrine system (147, 544). The exact mechanisms are not known, but temporary amenorrhea often coincides with a particularly stressful event (90, 176).

For additional information on hormonal disorders, see the publications in the box on p. L-136.

Endometriosis. An important cause of female infertility in developed countries (see Table 2), endometriosis is characterized by the growth of endometrial tissue on the fallopian tubes, ovaries, and other pelvic organs. Women with endometriosis are much more likely to be infertile than women without endometriosis (642). In one case-control study infertility was 20 times as common among women with endometriosis as among those without endometriosis (586).

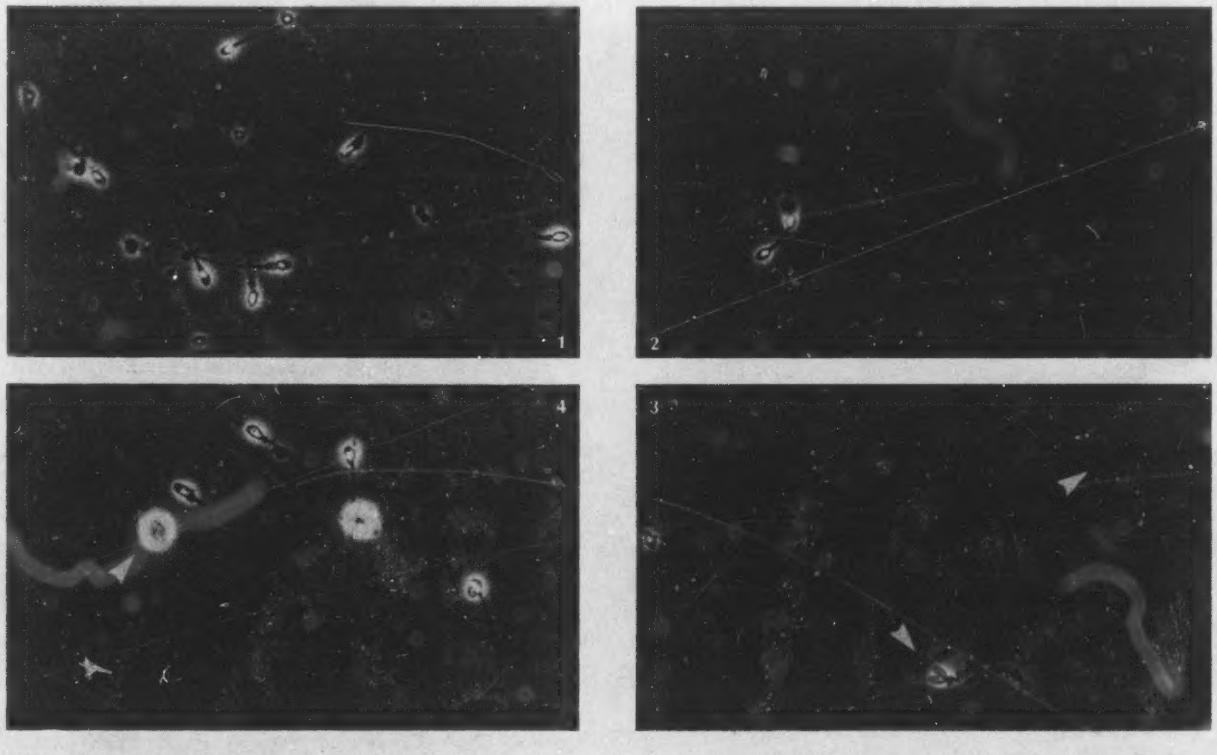
The causes of endometriosis are not fully understood (87, 164, 411). The most widely accepted explanation is that during menstruation some endometrial tissue passes through the fallopian tubes and implants on other organs (10, 87, 642). Under the influence of hormones during each subsequent menstrual cycle, this tissue grows and may shed, resulting in more implants. The implants eventually cause scarring and adhesions, both of which may distort the tubes and ovaries, interrupting ovum transport and causing infertility (285).

Cervical and uterine factors. Some congenital uterine or cervical abnormalities cause infertility. Cervical stenosis (a small cervical canal) and septate uterus (a uterus divided into two chambers) are two examples (262). Other cervical and uterine abnormalities are sometimes a consequence of induced abortion or childbirth (see p. L-125). For instance, uterine adhesions occasionally follow uterine surgery or curettage of the endometrium (238, 280).

Cervical mucus disorders can prevent passage of sperm or immobilize it. Hormonal imbalances such as low estrogen levels may cause inadequate cervical mucus or mucus so thick that it blocks sperm (142, 212). A small proportion of infertile women may produce antibodies that immobilize sperm in the cervix or cause sperm to stick together — often called "hostile cervical mucus" (18, 72, 269, 386, 541). How these antibodies act is not fully understood (556).

MALE INFERTILITY, STD, AND DISEASE

Male factors are thought to be the major cause of infertility in about 30 percent of all infertile couples and to contribute to infertility in another 20 percent (22, 202). For instance, a study of 275 Bangladeshi men attending an infertility clinic with their wives concluded that 29 percent of the men were probably infertile (122). In Singapore a study of 709 infertile couples found evidence of male infertility



Phase micrographs of four semen samples (clockwise from upper left): (1) Sperm count within the normal range—about 200 million per ml of semen. Above 20 million per ml is considered normal. (2) Low sperm count of about 3 million per ml. (3) Low sperm count with a high percentage of abnormal sperm, including 2-headed sperm and sperm with very small heads (see arrows). Less than 60 percent normal sperm may indicate infertility. (4) Normal sperm count, but cells that may be leucocytes (arrow) suggest genital infection. Background debris in all photos consists of noncellular material. (Courtesy of Thomas Chang, Sally Perreault, and Barry Zirkin) in 23 percent (485) (see Table 2, p. L-120). A US survey of 1,000 infertile couples found that about 30 percent of the men were infertile and another 15 percent were probably subfertile (600).

The contribution of male factors to infertility may often be underestimated, however, since infertility investigations traditionally have concentrated on women rather than men (154, 221, 394). The woman is almost always the first member of an infertile couple to be examined and usually is studied more intensively than the man. In many cases men are examined only when all possible female factors have been ruled out. Gynecologists are generally not knowledgeable about male infertility and often refer men to urologists, who themselves may have only limited knowledge of male infertility (394). Many men may refuse examination because they mistakenly believe that sexual potency is proof of fertility (303). For all these reasons, knowledge about male infertility and its treatment lags behind knowledge of female infertility (154, 394, 614).

Male infertility is most often caused by one of two conditions, either blockage of sperm ducts or disorders in sperm production. Both result in poor semen quality — semen that contains too few sperm and/or abnormal sperm. A less common condition is sexual malfunction that prevents ejaculation of semen.

Most men who seek medical help are classified as either azoospermic (having no sperm in semen) or, more likely, oligospermic (having a low concentration of sperm in semen) (214, 325). Subfertility is generally defined as a sperm count below 20 million sperm per milliliter of semen (23, 57). Many men with low sperm counts also have a high proportion of abnormally shaped sperm or of sperm that do not move normally. The reasons for poor semen quality can be determined in only about 10 to 15 percent of cases (107, 214). The remaining cases are usually classified as "ideopathic oligospermia" — oligospermia without apparent cause (614).

Table 4. Summary of Relationships Between Male Infertility and Diseases in Developing Countries

Disease	Cause/Effect Relationship	Epidemiologic Importance
Sexually Transmitted Diseases		
Gonorrhea	Yes—well-established	Major
Chlamydial Infections	Yes—few data	Unknown
Mycoplasmas *U. urealyticum*	Possible	Probably minor
Other Diseases		
Tuberculosis	Yes—well-established	Unknown
Bancroftian filariasis	Possible—few data	Probably minor
Leprosy	Yes—well-established	Minor
Mumps	Yes—well-established	Minor
Schistosomiasis	Possible—few data	Unknown

Source: adapted from Belsey, M.A. The epidemiology of infertility: a review with particular reference to sub-Saharan Africa. Bulletin of the World Health Organization 54(3): 319-341. 1976. See text, pp. L-128-130, for references and discussion.

In some developing countries one of the most commonly identified causes of poor semen quality is genital infection, usually with STDs (672) (see Table 4). When untreated, these infections can lead to complete blockage of sperm ducts, causing azoospermia (97, 325). In developed countries untreated genital infections and thus azoospermia are less common. Varicocele, a defective testicular vein or veins that cause abnormal blood flow to the testes, is often blamed for oligospermia in developed countries (153, 369), but its role in infertility is not clearly established. Other factors that contribute to abnormal semen include genetic abnormalities, hormonal imbalances, exposure to environmental pollutants, certain diseases, such as mumps, and possibly development of sperm antibodies (see Figure 5).

Sexually Transmitted Diseases

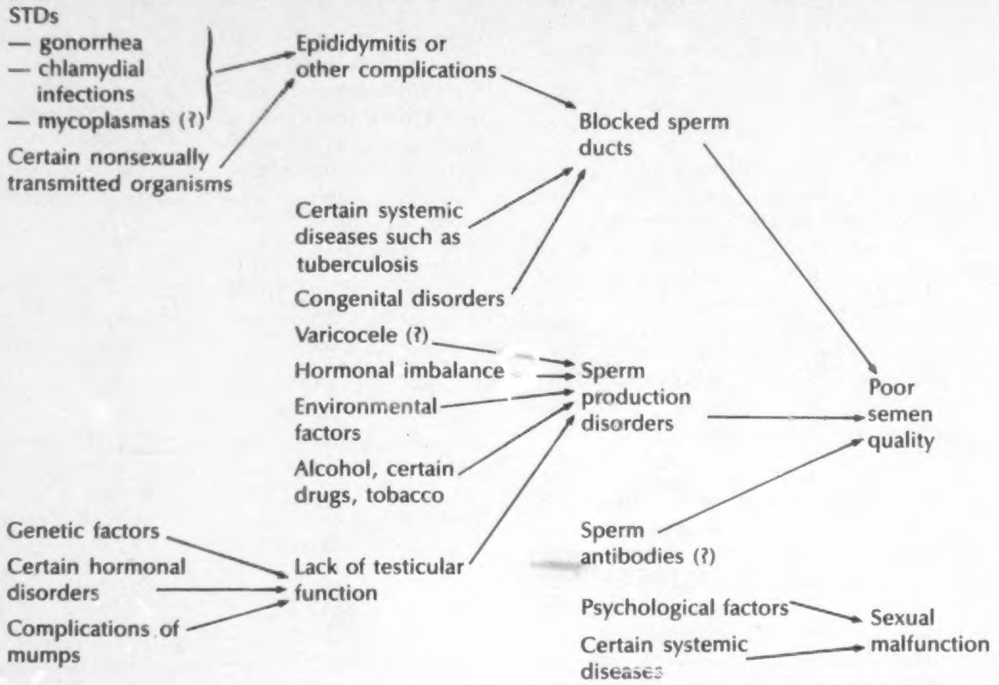
In men, as in women, untreated genital infection causes infertility by creating inflammation or blockage in the upper reproductive tract. Often due to STDs, these infections begin in the urethra (termed urethritis). If not adequately treated, they may spread to the vas deferens. It is estimated that in 25 to 30 percent of cases, infection reaches the epididymes (termed epididymitis) (62, 83) (see Figure 6). Epididymitis is a more serious condition than urethritis. Most men with epididymitis are temporarily subfertile simply from the infection itself (61, 429, 610). In addition, infections may cause scarring that partially or completely blocks sperm transport. An estimated 20 percent will have permanently impaired fertility (61). When epididymitis is not treated, the percentage becoming infertile may be as high as 50 to 80 (83). In India a study of 70 men with signs of current or past epididymitis found that 27 percent were azoospermic and another 34 percent had sperm counts of fewer than 40 million per ml of semen (396).

Untreated urethritis leading to epididymitis is relatively rare in developed countries, since most men who have symptoms are treated promptly with antibiotics. In some developing countries, however, untreated urethritis is a substantial problem (640, 673). Many men are not treated for urethritis for months or even years. For instance, clinic studies in Nigeria and Uganda found that, on average, men had symptoms for about 2½ years before they sought the help of medical personnel (282, 571). Moreover, where antibiotics are available without prescription, as in most developing countries, men usually attempt to treat themselves — often inadequately or inappropriately — before they seek professional help (444).

Because infections often are not properly treated, they may be a major cause of sperm duct blockage and resulting azoospermia in developing countries (672). For instance, a South Korean survey of infertile men found that about 40 percent were azoospermic and 20 percent had evidence of epididymitis (325). A Colombian survey of infertile men found that 30 percent were azoospermic and 37 percent had evidence of genital infection (97).

Gonorrhea. In men, untreated gonorrhea can lead to urethral abscess, urethral stricture, and inflammation of the prostate gland as well as epididymitis (37, 68, 282, 550, 640, 664). Many of the complications of gonorrhea can lower sperm counts, although untreated epididymitis is the most serious cause. In one Ugandan clinic, for in-

Figure 5. Relationships of Selected Direct and Indirect Causes of Male Infertility


STDs
— gonorrhea
— chlamydial infections
— mycoplasmas (?)
Certain nonsexually transmitted organisms
Epididymitis or other complications
Blocked sperm ducts
Certain systemic diseases such as tuberculosis
Congenital disorders
Varicocele (?)
Hormonal imbalance
Environmental factors
Alcohol, certain drugs, tobacco
Sperm production disorders
Poor semen quality
Genetic factors
Certain hormonal disorders
Complications of mumps
Lack of testicular function
Sperm antibodies (?)
Psychological factors
Certain systemic diseases
Sexual malfunction

stance, among 1,000 male STD patients, 91 had urethral stricture caused by chronic or recurring gonorrhea (282).

A Ugandan study compared the health of men and women in the Teso region, where gonorrhea was common and fertility relatively low, and in the Ankole region, where gonorrhea was uncommon and fertility high. Evidence of past epididymitis, as indicated by thickened epididymes, was much more common in Teso men. Although active gonorrhea infections were relatively uncommon, 28 percent of Teso men had thickened epididymes, compared with only 4 percent of Ankole men. Some 44 percent of childless men in Teso had thickened epididymes (38). The difference in fertility between the two regions is not necessarily due entirely to male infertility, however, since a similar difference in STD prevalence was found among women (see p. L-121).

Chlamydial infections. Studies in developed countries show that *Chlamydia* is the chief cause of nongonococcal urethritis. In the US from 40 to 50 percent of nongonococcal urethritis is chlamydial (82, 216). Symptoms of chlamydial urethritis usually are less severe than those of gonococcal urethritis. Perhaps because chlamydial urethritis may therefore go untreated, in developed countries more cases of epididymitis may be due to chlamydial infections than to gonorrhea. Gonorrhea still seems to be a more common cause of urethritis in developing countries (342, 383), although the proportion of chlamydial cases usually is unknown due to the difficulty of culturing the organism.

Mycoplasmas. The mycoplasma *U. urealyticum* causes perhaps as many as 20 to 25 percent of nongonococcal urethritis cases in the US (82, 216), but it is not known how often epididymitis and infertility result (175, 306, 598). A recent US study, however, suggests that asymptomatic infections may be important to male infertility — or perhaps to female infertility. The study followed 161 infertile couples for three years. Both husband and wife were treated for mycoplasma infection. In 129 couples the husband's infection was cured, and 60 percent of women had a pregnancy ending in a live birth. In 32 couples the husband's infection recurred after treatment. Only 5 percent had a successful pregnancy (608). Because other infertility-related infections may have been cured along with the mycoplasma infection and because many of the wives' infections were also presumably cured by treatment, further studies are necessary.

Other Diseases

Tuberculosis. Urogenital TB causes infertility in men by scarring and blocking the epididymis or, less commonly, through infection of the prostate, seminal vesicles, or vas deferens (20, 86, 379). Urogenital TB develops following infection of the lungs, but, as in women, symptoms of urogenital TB in men may not develop until many years after pulmonary infection (123). The proportion of men with pulmonary TB who later develop urogenital TB is unknown (199), although records from Scotland in the 1960s showed that the number of reported cases of male urogenital TB was 4 to 9 percent of the number of reported pulmonary TB cases (93).

Filariasis. Some investigators think that an important cause of male infertility is Bancroftian filariasis (373, 392, 421), a widespread disease in hot, humid areas that is caused by a mosquito-borne filarial worm (670). The parasites concentrate in the genital lymphatic system, blocking lymph drainage. Inflammation and swelling may occur in the testes, scrotum, epididymis, or vas deferens.

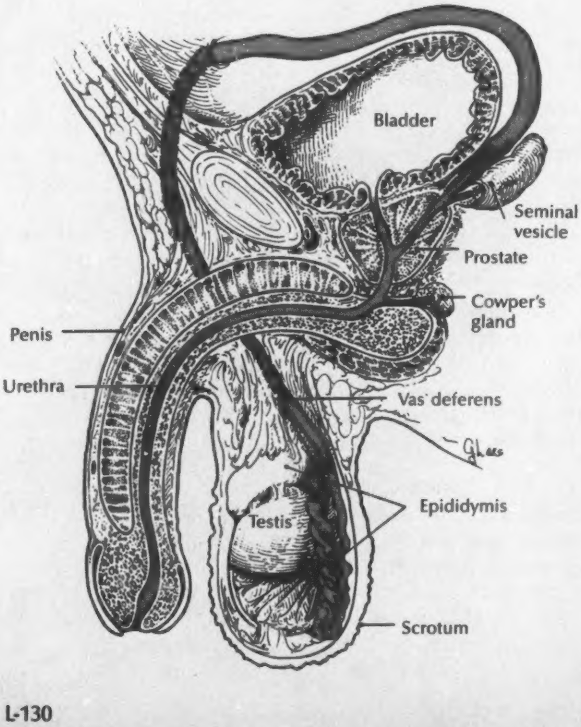
Epidemiologic studies on filariasis and infertility have produced contradictory findings. In Gabon men with microfilaremia — circulating filarial eggs — were significantly more likely than other men to have fewer than three children (311, 618). By contrast, a Philippine study found no relationship between microfilaremia and fertility or between lymphatic obstructions and fertility (208). Medical evidence of a link between filariasis and infertility is largely anecdotal (392, 421, 448).

Leprosy. The lepromatous form of leprosy also has been implicated as a cause of infertility. In the Philippines a 33-year study found that wives of men with lepromatous leprosy had 40 percent fewer births after the onset of symptoms than did wives of healthy men (564). Frequency of intercourse was not recorded, however. A 1952 US study of 179 men with leprosy found that 28 percent had atrophied testicles (200). Recent studies in India and Malaysia indicate that men with lepromatous leprosy also may develop high levels of sperm antibodies (526, 633, 634) (see p. L-132).

Mumps. In postpubertal males mumps can lead to orchitis (inflammation of the testes) and in severe cases to later atrophy of the testes (20). Among every 100 men who develop mumps, about 20 also develop mumps orchitis, and one or two of these will be affected in both testicles (308). Most men recover from mumps orchitis without fertility impairment (20). In a 1951 Swedish study, however, 98 men with a history of bilateral mumps orchitis reported an average of 1.1 impregnations each, compared with 2.1 each among age-matched controls who had not had mumps orchitis (56, 308).

Schistosomiasis. In infected men schistosome eggs frequently are found in seminal vesicles and occasionally in other parts of the male reproductive tract (118). Therefore some investigators have suggested that inflammatory reactions to the parasite's eggs could block sperm or else lesions could allow sperm to come into contact with the blood supply, causing immunologic infertility (8, 9).

Figure 6. The Male Reproductive Tract



Little evidence is available to support these suggestions. Large autopsy series in Egypt, Nigeria, and Zimbabwe have found schistosome eggs in the male reproductive tract, but little inflammation around the eggs (118, 158, 185). Two Egyptian studies found high sperm antibody titers in men with schistosomiasis (8, 9), but neither could show directly that schistosomiasis contributed to the development of these antibodies.

OTHER CAUSES OF MALE INFERTILITY

In addition to certain infectious diseases, a variety of factors may impair sperm production and so cause male infertility. These include hormonal and genetic abnormalities and exposure to external influences that impair sperm production. Varicocele is often diagnosed as a cause of infertility, but it is not clear whether this condition adversely affects sperm production.

Varicocele

Varicocele is caused by incomplete valves in one or more testicular veins. It allows excess venous blood to flow around the testis. Some researchers think that this excess blood flow interferes with sperm production by raising the temperature or increasing serum levels of toxic metabolites in the testes (53).

The relationship between varicocele and male infertility is not clear, however. In the US varicocele is found in 20 to 40 percent of men attending infertility clinics (206). In about half, sperm counts are low, sperm motility is poor, and a high proportion of sperm cells are immature and abnormal (53, 155, 348). In the other half, however, sperm production is not affected. In fact, varicocele is a relatively common condition. It occurs in 10 to 15 percent of all US men, including men who are not infertile (206, 347).

Some studies report that surgical repair of varicocele (varicocelectomy) improves semen quality in 60 to 70 percent of cases and that pregnancies follow in 40 to 50 percent of cases (155, 206, 347). Other studies have found no significant differences in semen quality or pregnancy rates between men with corrected varicocele and men with uncorrected varicocele (428, 513).

Hormonal, Genetic, and Immunologic Factors

Hormonal imbalances that cause infertility are much less common in males than in females (22, 600). Partly because of this, even less is known about the problem in men than in women. Best understood are the effects of severe hormonal abnormalities caused by genetic disorders. For instance, men with Klinefelter's syndrome — a genetic disorder found in 0.2 percent of men — have low testosterone levels. Since testosterone promotes sperm production, affected individuals are azoospermic. Some may also experience breast development and atrophied testes (28). In Kallman's syndrome, another genetic disorder, the hypothalamus fails to secrete gonadotropin-releasing hormone and thus the pituitary does not produce follicle-stimulating hormone (FSH) or luteinizing hormone (LH).

Incidence of Infertility-Related STDs

Gonorrhea, syphilis, and chlamydial infections — the three STDs that most clearly cause infertility — are epidemic in many areas. The most reliable data on their incidence come from developed countries, where both gonorrhea and syphilis usually must be reported. Underreporting is a problem, however, especially among private physicians. Data on chlamydial infections come from scattered reports only, since these infections are difficult to diagnose and usually need not be reported. In most developing areas, although STDs are clearly a public health problem (56, 648, 672, 673, 674), information is limited. National data, where available, greatly underreport cases, especially among women (27, 455, 643).

Gonorrhea

Gonorrhea is one of the most common diseases in developed and developing countries (668). In many countries gonorrhea appears to have become more common during the 1960s and 1970s, as shown below:

Country	Reference Number	Reported Cases of Gonorrhea per 100,000 Population
Canada	565	129 (1969) — 205 (1973)
Costa Rica	257	120 (1965) — 492 (1977)
Cuba	643	8 (1972) — 104 (1978)
Denmark	565	264 (1969) — 331 (1973)
US	623	169 (1965) — 473 (1975)

According to clinical reports, gonorrhea may be very common in many African countries. In Nairobi, Kenya, 18 percent of 200 women attending a family planning clinic had gonorrhea (240). In Cameroon 12 to 15 percent of 1,326 women at maternity or child health centers had gonorrhea (422). It is estimated that in Kampala, Uganda, 10,000 people per 100,000 population have gonorrhea; in rural Uganda, 3,000; and in Nairobi, Kenya, 7,000 (36).

Intensive gonorrhea control efforts have stopped the rise in gonorrhea rates or even reduced rates in a few countries. In Sweden an intensive gonorrhea control program led to a drop in the gonorrhea rate between 1970 and 1975 — from about 500 per 100,000 to about 300. The rate may have begun increasing again after 1975, however (636). In the US, stepped-up control efforts started in 1972. The gonorrhea rate peaked in 1975 at 473 and has been stable through 1980 (692).

Gonorrhea is becoming increasingly resistant to penicillin, the antibiotic most often used as treatment. Totally resistant strains, called penicillinase-producing *N. gonorrhoeae* (PPNG) (also called β-lactamase producing), were first identified in the Philippines and West Africa in 1975. They have since been found in over 50 countries and probably occur in many others (112, 669, 686). In some African, Asian, and European areas PPNG strains now make up a major portion of all identified strains — 20 to 30 percent in some clinics in Kenya and Ghana and 50 percent in some clinics in Bangkok, Thailand, for example (669).

Pelvic inflammatory disease (PID) — often caused by gonorrhea or chlamydial infection — also has become more common. In the US, where about half of PID episodes are associated with gonorrhea (131, 134, 161, 594), the increase in PID paralleled the increase in gonorrhea through the early 1970s (654). After the gonorrhea control program was stepped up in 1972, hospital admissions for PID slowed and the number of visits to private physicians for PID decreased (527, 529). Still, at present nearly one million US women a year suffer from PID and its aftereffects — pain, infertility, and ectopic pregnancy (135).

Syphilis

Vigorous public health campaigns have checked the spread of syphilis in some countries, but in others rates have been increasing. The incidence rate in the US remained stable from 1961 through 1979 at about 9 to 12 cases per 100,000 (623). In Canada, Denmark, Sweden, West Germany, and the UK, rates were stable from 1969 at least through 1973 at fewer than 10 cases per 100,000 (565). In Cuba a program begun in 1972 that emphasized screening and prophylactic treatment of syphilis contacts kept the rate stable from 1974 through 1978 (643).

Increasing rates are reported in many areas, however. In Costa Rica the rate increased fourfold between 1965 and 1976, from 45 to 185 (257). In Papua New Guinea the rate tripled between 1973 and 1978, from 39 to 117. In the same period the other South Pacific islands, taken together, experienced a 13-fold increase, from 5 to 65 (660, 661).

Although the incapacitating effects of tertiary syphilis are less common worldwide than they were 40 years ago (674), congenital syphilis and its effects remain serious health problems in a number of developing areas where syphilis rates may be high (674). In Lusaka, Zambia, for instance, about 7 percent of newborns have congenital syphilis (231, 232). In India about 5 percent of stillbirths or neonatal deaths have been attributed to congenital syphilis (380, 413).

Chlamydial Infections

Although information is scant, chlamydial infections seem to be widespread and increasing in many areas (536). In the UK nonspecific or nongonococcal urethritis is about 1.8 times as common as gonococcal urethritis (565). Since *Chlamydia* accounts for 30 to 60 percent of nongonococcal urethritis in many clinic populations (82, 216, 673), the rate of chlamydial infection in the UK may be close to the gonorrhea rate. Based on similar data (113, 371), the US rate is estimated to be about 200 per 100,000.

Chlamydial infections probably are common in developing countries also (673), although perhaps less so than in some developed countries. A recent Gambian study found that 14 percent of 65 men with gonorrhea had simultaneous chlamydial infections and 21 percent of 20 men with nongonococcal urethritis had chlamydial infections (342). Although a study in Nairobi found that only 4 to 9 percent of patients attending family planning clinics, antenatal clinics, and STD clinics had acute chlamydial infections, blood tests showed evidence of past infection in 91 percent of women and 80 percent of men (433). While blood test results may sometimes reflect a past infection with another chlamydial strain (673), these data suggest that infections with *C. trachomatis* may be common in Nairobi.

Because FSH and LH are necessary to stimulate the testes to develop and release testosterone, puberty never takes place (637). Failure of the hypothalamus or pituitary — sometimes caused by a pituitary tumor — also can affect FSH and LH secretions. The result is impotence, atrophied testes, and/or loss of secondary sex characteristics (552). Recently, individual studies have linked low sperm counts to high FSH levels (426) or low LH levels (465), but these reports have not yet been confirmed.

Occasionally, a man produces antibodies that, when present in the semen, reduce the motility of sperm. These sperm antibodies may be more likely to develop when sperm come in contact with tissues outside the sperm ducts. For instance, in vasectomized men, sperm may enter the tissues that surround the blocked vas deferens. Some men who have had vasectomies surgically reversed remain involuntarily infertile. A substantial proportion of these men have antibodies to sperm (26, 51, 458, 555). Other aftereffects of vasectomy — such as permanent damage to the epididymes or testicular cells — may have more effect on semen than antibody production, however (241, 558).

Environmental Pollutants, Alcohol, Drugs, and Tobacco

Environmental pollutants. Exposure to toxic substances, radiation, or extreme heat may affect male fertility (376, 430). Radiation impairs sperm production, but the effect seems to be temporary in most cases (521). Exposure to high levels of pesticides reduces sperm counts (104, 653). Occupational exposure to lead can reduce sex drive and sperm counts (85, 309). Extreme heat may reduce male fertility, since the optimum temperature for sperm production is about 2° C below normal body temperature (463). A Mexican survey of 200 men in infertile marriages — 65 percent of whom had sperm counts below 30 million per ml of semen — found that 30 percent were exposed to extreme heat and 78 percent wore tight supporting trusses which raised the scrotal temperature during work (459).

Alcohol. Alcoholic men often produce less testosterone. The testes may eventually atrophy, and the breasts may become enlarged (1, 21, 637). Moderate drinking does not seem to reduce fertility in otherwise normal men, but in men with borderline sperm counts moderate drinking may reduce fertility (1).

Drugs. Powerful therapeutic drugs such as those used in cancer therapy or for the control of mental disorders often cause temporary or permanent infertility, probably by directly affecting testicular cells (46, 151, 187). Less is known about the effects of illegal drugs, such as marijuana, cocaine, opium, or heroin, due to the difficulty of collecting data. Preliminary reports suggest that heavy marijuana smokers have lower sperm counts, lower sperm motility, and more abnormal sperm than other men (1).

Tobacco. Cigarettes also probably affect male fecundity. Reports from the UK and Egypt concluded that, on average, cigarette smokers have fewer motile sperm and more abnormal sperm than nonsmokers (163, 548). By contrast, a recent US study of men in infertile marriages found no difference in semen quality between smokers and nonsmokers (512). In some infertile men, however, semen quality improved markedly when they stopped smoking (21).

INFERTILITY THERAPY

Infertility therapy is often unsuccessful. Only about one-quarter to one-half of all couples treated achieve a live birth (150, 261, 275, 485, 573, 604). The chances of success depend mostly on the cause of infertility.

In general, when infertility is caused by prior infection — either tubal damage in females or epididymal or vas blockage in males — the prognosis is poor. Surgical repair of either condition, even when performed by experienced surgeons on carefully selected patients, leads to pregnancy in no more than 20 to 30 percent of cases (152, 510). When pregnancies occur after surgery for blocked fallopian tubes, 6 to 15 percent are ectopic (196, 256, 510). Thus live birth rates are even lower. Studies in Senegal and Kenya reported live birth rates of only 6 percent after tubal surgery (239, 632). By contrast, ovulation disorders often respond to treatment. In clinics in both developed and developing countries, pregnancy rates as high as 50 to 60 percent have been reported (19, 67, 300, 476).

For some conditions, treatment may make little difference. For instance, with mild endometriosis in women, varicocele in men, and unexplained infertility, pregnancy rates often are about the same for treated and untreated couples (13, 129, 428, 543).

Where it is available, infertility therapy is often long and costly (291, 522). Several different diagnostic procedures may be necessary. Even then, the cause may remain unexplained in as many as 20 percent of couples (see Table 2). Costly drugs taken for a long period or expert surgery may be tried before pregnancy occurs or patients and/or doctors decide against further treatment. In one Latin American clinic seven visits per couple were the average. In 20 percent of couples, between 11 and 40 visits were necessary (55). It was estimated that in 1980 in Paris, an average birth following infertility therapy cost the equivalent of about $8,000 (US), including delivery. Without infertility therapy, a birth cost an average of about $1,750 (55).

Many government health services lack adequate personnel, drugs, and equipment to diagnose and treat infertility. Only couples who can attend expensive private clinics have access to comprehensive services. Even there, a full array of diagnostic procedures and drugs may not be available except in developed countries. In an informal survey of 21 developing-country physicians attending an infertility therapy training course in the US, all but two reported that lack of facilities and equipment, shortage of drugs, and/or cost were major barriers to providing infertility services (470).

Although a variety of diagnostic and treatment procedures are used by infertility specialists, only simple procedures that can be used by general health care providers are discussed here. For detailed information on more sophisticated procedures, see the box on p. L-136.

Simple Diagnostic Procedures

There are at least six relatively simple diagnostic procedures that can be used to try to discover the causes of infertility.

- medical histories and examinations of both male and female,
- semen analysis for the male,
- ovulation detection for the female,
- tubal patency test for the female,
- laparoscopy for the female,
- postcoital test for both male and female.

The first step in an infertility evaluation is a comprehensive medical and reproductive history of *both* members of the infertile couple. Any report of genital infection in the man or woman or of menstrual disorders in the woman is especially important. Both partners should have physical examinations. The genitals should be carefully examined for any abnormalities that might indicate a hormonal or genetic disorder or an infection (287, 553).

For the man, the major test for evaluating fertility is semen analysis (567). Semen usually is collected through masturbation and within a few hours examined for (1) total volume, (2) millions of sperm per milliliter of ejaculate (sperm count), (3) motility of sperm, (4) shape and size of sperm, and (5) presence of bacteria or white blood cells, indicating infection. Ideally, more than one sample should be taken, since semen quality varies over time (568).

For the woman, simple ovulation detection tests are often used to diagnose infertility. The indicators of ovulation usually monitored are basal body temperature shift and cervical mucus changes (221). Body temperature rises about 0.2 to 0.9° C about one or two days after ovulation, responding to a rising level of progesterone. Daily monitoring of body temperature may reveal whether ovulation has occurred. Cervical mucus changes in consistency and quantity over the menstrual cycle. Just after menstruation it is absent or present in small amounts. Shortly before ovulation it is sticky, cloudy, and more copious. Around the time of ovulation it is plentiful and becomes slippery and clear. (For more explanation of these two methods of ovulation detection, see **Population Reports**, *Periodic Abstinence: How Well Do New Approaches Work?*, I-3, September 1981.) Endometrial biopsies also can be used to assess whether ovulation occurs and whether the endometrium develops normally (431, 503).

Although more difficult than other tests, tubal patency tests — carbon dioxide insufflation (Rubin's test) and hysterosalpingography — are important because they indicate whether a woman's tubes are blocked. In an insufflation test, carbon dioxide is injected through the cervix. The passage of the gas through the uterus and tubes is then monitored with a pressure gauge. Hysterosalpingography is more accurate and provides information about both the uterus and tubes (505). It involves injection of radiopaque dye through the cervix followed by X-ray examination (553) (see photos, this page). Tubal patency tests must be performed by physicians and must never be undertaken when there is evidence of a cervical infection or PID, since the tests can spread the infection.

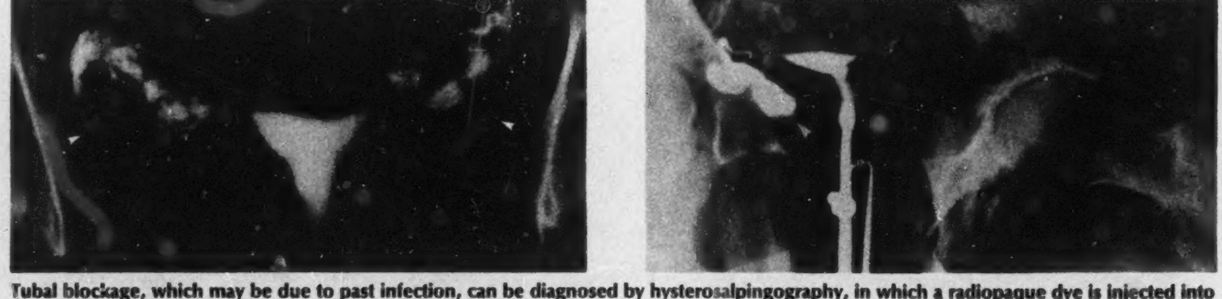
Where equipment and trained personnel are available, laparoscopy also may be used to diagnose female infertility, particularly when the results of other tests are inconclusive. The direct view of the abdominal cavity through the laparoscope permits clearer diagnosis of adhesions, PID, endometriosis, and ovarian growths (179, 304, 600).

Information about both men and women can be obtained from another simple diagnostic test, the postcoital test. Also called the Sims-Huhner test, this test involves taking a sample of cervical mucus two to three hours after coitus near the time of ovulation. The mucus is examined under a microscope at high power (400 times magnification). Although standards vary (189, 611), about 10 to 20 motile sperm per high-power field is considered normal (274, 553, 600, 611). If too few sperm are found or if sperm are abnormally shaped or nonmotile, semen problems or "hostile cervical mucus" are suspected.

Simple Treatment Procedures

Although most infertility treatments involve surgery and/or long-term medication, some problems are easily treated. Couples with no identifiable cause of infertility may be only subfertile and often achieve pregnancy with the help of simple strategies such as timing coitus to coincide with ovulation. Couples who are infertile due to current asymptomatic infections — usually gonorrhea or chlamydial or mycoplasma infections — can be given antibiotics to cure the infection (see Figure 7).

If sperm count is moderately low and cannot be treated or if a husband has problems with ejaculation, one approach that can be tried is artificial insemination with husband's semen (AIH). The aim of AIH is to assure that the maximum number of sperm reach the fallopian tubes. AIH involves collecting semen — often just the first portion of the ejaculate, which contains the highest concentration of sperm — and placing it at the entrance to the cervix, inside the endocervical canal, or in the uterus at about the time of ovulation (600). Reported pregnancy rates after AIH generally are low — from 4 to 30 percent (107, 149, 576, 581). A recent US study of 61 couples in whom infertility was due to the man reported a higher rate — 53 percent — when couples were taught how to do a basic AIH procedure at home (148).



Tubal blockage, which may be due to past infection, can be diagnosed by hysterosalpingography, in which a radiopaque dye is injected into one or both tubes. If an X-ray shows the dye spilling out of the tubes (arrows, left), both tubes are patent, or unblocked. If dye does not spill out but backs up instead (right), the tubes are blocked, causing infertility. At right, only one tube is being tested. (Courtesy of John Rock)

In Vitro Fertilization

Since P.C. Steptoe and R.G. Edwards announced the birth of the first "test-tube baby" in 1978 (584), infertility treatment through *in vitro* fertilization and embryo transfer has attracted much attention. While the procedure appears promising, it is still considered experimental and is used only as a last resort for carefully selected patients (263, 635).

Medical groups in at least 10 developing countries have started services for *in vitro* fertilization and embryo transfer (263). As of early 1983 about 400 pregnancies and 150 live births, including three sets of twins and one of triplets, had occurred as a result of the procedure (7, 169, 263).

Currently, to be eligible for *in vitro* fertilization and embryo transfer, couples must have tried other infertility treatment without success (263, 635). In many cases the woman has irreparable tubal damage, severe endometriosis, or hostile cervical mucus. Some couples have unexplained infertility or mild oligospermia (263).

Most medical groups that perform *in vitro* fertilization use hormonal therapy first to stimulate ovarian activity and then to induce ripening of the ovarian follicles that release the ova. One or more ripe ova are recovered by laparoscopy and then incubated for about six hours before a carefully washed sperm sample is added. If fertilization occurs, the eggs are further incubated until the 2- to 8-cell stage is reached. Then they are transferred into the uterus. To maximize chances of implantation, the patient must remain stationary for four hours or more, followed by about 36 hours of bed rest. Progesterone is administered daily for 10 days to decrease the chances of abortion (133, 264, 265, 326, 336, 337, 366, 603, 615).

Only one published series reports the number of pregnancies achieved per laparoscopies performed. In the second half of 1981 an Australian team performed 128 laparoscopies, recovering ova in 115 cases (90 percent). Fertilization occurred in 89 (70 percent), leading to embryo transfer in 83 (65 percent). Pregnancy was established in 10 women (8 percent of laparoscopies or 12 percent of embryo transfers) (337). Most recent series report a somewhat higher rate of pregnancies per embryo transfer — about 20 percent (169, 263, 264, 326, 635). Currently, there are no published reports on the proportion of live births resulting from the procedure.

In vitro fertilization is expensive. In the US, for example, medical, hospital, and laboratory costs vary from about $2,500 to $7,500 per cycle (169, 263). Actual costs for the patients include travel to and living expenses at a treatment center — about $1,500 per cycle. Since many couples repeat the procedure for several cycles (337), the total cost may exceed $10,000. While the knowledge being gained may eventually benefit many infertile couples, at present this sophisticated new treatment is available only to a small number of infertile couples.

In women with ovulation disorders, a few relatively simple drug therapies can be used. Clomiphene citrate (Clomid), the most common, induces ovulation by counteracting the ovulation-suppressive effects of estrogen during the first portion of the menstrual cycle. Clomiphene citrate is taken orally, usually for five days beginning on about the fifth day of the menstrual cycle. If a dose of 50 mg per day does not bring on ovulation, doses of up to 250 mg per day, often administered for 10 days, are given in subsequent cycles. About 70 to 80 percent of selected women ovulate as a result of this therapy. Pregnancy rates usually range from about 30 to 50 percent (19, 67, 300, 476). Spontaneous abortion rates often are relatively high, however — between 20 and 25 percent (180, 256).

Clomiphene citrate has few serious side-effects but in many countries it is relatively expensive. At lower doses patients may occasionally have some ovarian enlargement and abdominal discomfort. At higher doses some patients also experience visual disturbances or hot flashes (180). The risk of multiple births appears to be small. For instance, in one series of 50 term pregnancies after clomiphene therapy, 3 resulted in twins (67). Physicians from Egypt, Fiji, Thailand, and Yemen report that clomiphene costs between $15 and $20 (US) per cycle (470). The price in the US is similar. In some countries — Bangladesh, for one — it is not available (122).

Bromocriptine is sometimes used to induce ovulation in women with high prolactin levels. A regimen of 7.5 mg per day lowers prolactin levels, and ovulation usually resumes after 30 to 90 days of treatment (44, 605). Reported pregnancy rates after return of ovulation range from 50 to about 90 percent (64, 171). Spontaneous abortion rates are relatively low — about 12 percent (256). Bromocriptine costs about $40 per month in the US. In developing countries it is even more expensive. For instance, in Egypt bromocriptine can cost about $100 (US) per month (470).

The range of simple treatments that can be used by general health care providers is relatively limited. Most infertility treatments are more sophisticated and expensive. One relatively new procedure, *in vitro* fertilization, is an example of how complex treatments can become (see box at left). Clearly, this therapy, along with many others, is out of the reach of most infertile couples.

PREVENTION

Prevention is always better than treatment. In the case of infertility, prevention is doubly important because treatment is expensive and its success, uncertain (56, 204, 418). Although some causes of infertility cannot be prevented, public health programs can prevent much infertility that is due to infection by paying more attention to the major reasons for infection:

- sexually transmitted diseases,
- poor obstetric care,
- illegal abortion.

Public health programs aimed at these causes of infertility are not easy to implement. First, they require a level of political support that is often difficult to achieve (36, 658). Second, such programs compete for funding with programs to prevent or treat serious endemic diseases that

Figure 7. Simple Treatment Regimens for STDs and PID[a]

Uncomplicated Urogenital Gonorrhea[b]

Against penicillin-sensitive strains:

Either

Aqueous procaine penicillin G 4.8 million units intramuscularly *or*

Amoxycillin 3.0 grams orally *or*

Ampicillin 3.5 grams orally *plus*

Probenecid 1.0 g orally

Ineffective against concurrent chlamydial infection.

↓

For patients with penicillin allergies:

Tetracycline 500 mg orally 4 times daily for 7 days *or*

Doxycycline 100 mg orally twice daily for 7 days

Unsafe in pregnancy.

Multiple doses required.

Effective against concurrent chlamydial infection.

↓

Against penicillin-resistant strains:

Spectinomycin 2.0 g intramuscularly *or*

Ceftriaxone 250 mg intramuscularly *or*

Cefotaxime 1.0 g intramuscularly *or*

Cefoxitin 2.0 g intramuscularly *plus* 1.0 g probenecid orally

Less effective in some places but less expensive and sometimes more available are:

Kanamycin A 2.0 g intramuscularly *or*

Thiamphenicol 2.5 g orally

Ineffective against concurrent chlamydial infection.

PID

For outpatients with gonococcal or nongonococcal PID[c]:

Single-dose therapy for uncomplicated gonorrhea *plus either*

Tetracycline HCl 500 mg orally 4 times daily for 10 days *or*

Doxycycline 100 mg orally twice daily for 10 days *plus*

Metronidazole 1.0 g twice daily for 10 days

↓

Hospitalized patients:

Combined regimens of several antibiotics active against a broad spectrum of pathogens. Drugs include doxycycline plus cefoxitin or doxycycline plus metronidazole. All administered intravenously in hospital, followed by oral regimen after discharge.

Uncomplicated Chlamydial and Mycoplasma Infections

Tetracycline HCl 500 mg orally 4 times daily for 7 days *or*

Doxycycline 100 mg orally twice daily for 7 days

Unsafe in pregnancy.

Multiple doses required.

↓

For pregnant or tetracycline-intolerant patients:

Erythromycin 500 mg orally 4 times daily for at least 7 days

Multiple doses required.

Syphilis

For primary or secondary syphilis:

Benzathine penicillin G 2.4 million units intramuscularly

↓

For patients with penicillin allergies:

Tetracycline HCl 500 mg orally 4 times daily for 15 days

Unsafe in pregnancy.

Multiple doses required.

or

Erythromycin (not the estolate) 500 mg orally 4 times daily for 15 days

Multiple doses required.

↓

For congenital syphilis[d]:

In symptomatic infants or asymptomatic infants with abnormal cerebrospinal fluid:

Aqueous crystalline penicillin G, 50,000 units per kg of body weight, intramuscularly or intravenously twice daily for at least 10 days *or*

Aqueous procaine penicillin G, 50,000 units per kg of body weight, intramuscularly daily for at least 10 days.

In asymptomatic infants with normal cerebrospinal fluid[e]:

Benzathine penicillin G, 50,000 units per kg of body weight, single intramuscular dose.

Penicillin has been widely used to treat gonorrhea. Because penicillin-resistant strains are becoming more common, other, more costly drugs must be used in many areas. (Kay Chernush/US AID) affect the entire population, such as malaria, schistosomiasis, and tuberculosis. Third, prevention programs require knowledge of which conditions or diseases are most prevalent — information that is not always available in regions where infertility is greatest (4, 56).

---

[a] Recommended by US Centers for Disease Control (3, 110, 115) and World Health Organization (669, 672, 673, 674) and/or the African Union Against the Venereal Diseases and the Treponematoses (683). Listed regimens generally are the simplest possible for each category of disease.

[b] For epididymo-orchitis, single-dose therapy for uncomplicated urogenital gonorrhea should be supplemented with tetracycline HCl 500 mg orally 4 times daily, doxycycline 100 mg orally twice daily, or erythromycin 500 mg orally 4 times daily, all for 10 days (669).

[c] Where possible, hospitalization of PID patients is preferred.

[d] Congential syphilis responds well to treatment, but treatment cannot reverse prenatal damage to bones, organs, or the central nervous system. Maternal screening and treatment during pregnancy can minimize prenatal damage.

[e] Where cerebrospinal fluid testing is not available, regimens of crystalline or procaine penicillin can be used for all cases but require multiple doses. Some practitioners consider single-dose benzathine penicillin adequate for infants without central nervous system disease.

Nevertheless, preventive public health programs remain the most cost-effective approach to infection-related infertility. In the long run such programs not only reduce individual suffering but also reduce the increasingly heavy cost to the whole community of treating genital infections and their effects. In the US, for example, it is estimated that syphilis and gonorrhea control efforts in 1981, which cost the US government about $47 million, saved about $150 million in health care costs — $119 million by preventing complications of gonorrhea and syphilis, $24 million by preventing uncomplicated gonorrhea, and $6 million by preventing the spread of penicillin-resistant strains of gonorrhea (655).

Public health programs that would help prevent infertility include:

- **STD control programs** — organized efforts to limit the number of persons infected and to minimize the consequences of infection.
- **STD education programs** — public education to inform people of the causes, symptoms, and dangers of STDs, how to avoid infection, and how and where to obtain treatment.
- **Programs to improve obstetric care** — training for traditional practitioners and other nonphysicians who attend childbirth and provide women's health care, teaching them how to reduce the risk of infection during uncomplicated births and when to refer women to health centers for further attention.
- **Family planning programs** — services to supply contraceptives, which give women an alternative to illegal abortion, and to promote especially the methods that protect against infection (see p. L-141).

STD Control Programs

Most organized efforts to combat STDs begin with medically oriented control programs. Public education, al-

Resources for Clinicians: Information on Infertility Management

The following books provide detailed information on the diagnosis and treatment of female and male infertility:

Garcia, C.-R., Mastroianni, L., Jr., Amelar, R.D., and Dubin, L., eds. Current therapy of infertility, 1982-1983. Trenton, New Jersey, B.C. Decker, 1982. 256 p. $32.00 (US). *The management of various causes of infertility described in short articles by practicing physicians.* Distributors: C.V. Mosby Co., Ltd., 11830 Westline Industrial Drive, St. Louis, Missouri 63141, USA. In Canada, C.V. Mosby Co., Ltd., 120 Melford Drive, Scarborough, Ontario M1B 2X5.

Insler, V., Bettendorf, G., and Geissler, K.-H., eds. Advances in diagnosis and treatment of infertility. New York, Elsevier/North-Holland, 1981. 405 p. $71.50 (US). *Papers presented at the Organon Symposium held in Bad Reichenhall, West Germany, June 30-July 3, 1980.* Distributors: In US and Canada, Elsevier/North Holland, Inc., 52 Vanderbilt Avenue, New York, New York 10017, USA. Elsewhere: Elsevier Science Publishers B.V., P.O. Box 211, 1000 AE Amsterdam, The Netherlands.

Philipp, E.E. and Carruthers, G.B. Infertility. London, William Heinemann Medical Books, Ltd., 1981. 268 p. £25.00. *A basic text covering the diagnosis and management of infertility.* Distributor: William Heinemann Medical Books, Ltd., 23 Bedford Square, London WC1B 3HH, UK.

Wallach, E.E. and Kempers, R.D., eds. Modern trends in infertility and conception control. Vol. 1. Baltimore, Williams and Wilkins, 1979. 439 p. $23.50 (US). *Three dozen lead articles from* Fertility and Sterility, *the journal of the American Fertility Society.* Distributor: Williams and Wilkins Co., 428 East Preston Street, Baltimore, Maryland 21202, USA.

Wallach, E.E. and Kempers, R.D., eds. Modern trends in infertility and conception control. Vol. 2. Philadelphia, Harper & Row, 1982. 477 p. $27.50 (US). *Three dozen more lead articles from* Fertility and Sterility. Distributor: To individuals, Harper & Row, 2350 Virginia Avenue, Hagerstown, Maryland 21740, USA. To institutions, Harper & Row, Keystone Industrial Park, Scranton, Pennsylvania 18512, USA.

The following books contain specific information on semen analysis, postcoital tests, hormonal infertility, and surgical management of tubal and ovarian damage:

Belsey, M.A., Eliasson, R., Gallegos, A.J., Moghissi, K.S., Paulsen, C.A., and Prasad, M.R.N., eds. Laboratory manual for the examination of human semen and the semen-cervical mucus interaction. Singapore, Press Concern, 1980. 43 p. *Based on consultations for WHO, this manual is designed to help WHO-affiliated researchers investigating aspects of male infertility. It is also useful to physicians who treat infertile men.* Distributor: A limited number of copies are available free of charge from: Special Programme of Research, Development and Research Training in Human Reproduction, World Health Organization, 1211 Geneva 27, Switzerland.

Crosignani, P.G. and Rubin, B.L., eds. Microsurgery in female infertility. London, Academic Press, and New York, Grune and Stratton, 1980. 134 p. $26.00 (US). *Papers presented at the first Serono Clinical Colloquium on Reproduction.* Distributor: Grune and Stratton, 111 Fifth Avenue, New York, New York 10003, USA; or Academic Press, 24/28 Oval Road, London NW1 7DX, UK.

Crosignani, P.G. and Rubin, B.L., eds. Endocrinology of human infertility: new aspects. London, Academic Press, and New York, Grune and Stratton, 1981. 484 p. $67.50 (US). *Papers presented at the second Serono Clinical Colloquium on Reproduction.* Distributors: Grune and Stratton or Academic Press (as above).

Jones, H.W., Jr. and Rock, J.A. Reparative and reconstructive surgery of the female generative tract. Baltimore, Williams and Wilkins, 1983. 350 p. $49.95 (US). *A comprehensive text on surgical management of congenital and acquired defects of the genital tract and on in vitro fertilization.* Distributor: Williams and Wilkins, 428 East Preston Street, Baltimore, Maryland 21202, USA.

The following US institutions offer publications and other information about basic infertility services:

Ferre Institute, Inc., 1424 Genesse Street, Utica, New York 13502, USA.

The American Fertility Foundation, 1608 13th Avenue South, Birmingham, Alabama 35256, USA.

The Ferre Institute is a nonprofit organization that promotes a couple-oriented approach to infertility services. The American Fertility Foundation, a part of the American Fertility Society, provides literature on infertility diagnosis and treatment at low cost.

though often added later, also is important. Comprehensive STD control programs involve (1) accurate reporting of STD cases, (2) early diagnosis and effective treatment of STDs and their complications, (3) finding and treating sexual contacts of infected persons, and (4) screening high-risk groups for STDs. A comprehensive program operates best where there are well-established health services with adequate resources, extensive cooperation, and good follow-up capabilities. In many developing areas, control efforts often must begin with specific, limited tasks — for instance, assessing the problem, treating the most common STDs, or screening for prenatal syphilis.

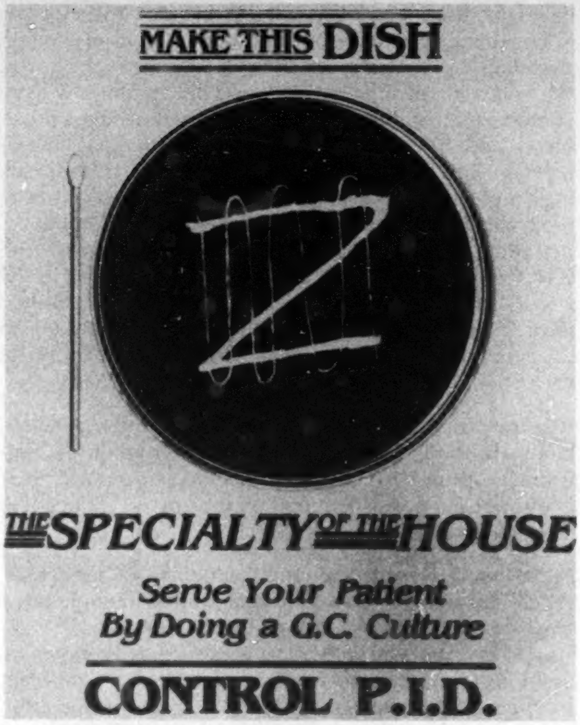
Syphilis was the target of early STD control programs, mainly because some of its effects (such as congenital syphilis, cardiovascular syphilis, and insanity) are obvious and serious. While syphilis was difficult to manage before penicillin became available, now relatively simple, inexpensive blood tests are available for screening and diagnosis, and a single dose of long-acting penicillin provides a cure (115, 674).

Gonorrhea is more difficult to control because it is more difficult to diagnose, requiring genital examination and smear or culture testing of urine, pus, or mucus (37, 662). Moreover, a large and increasing proportion of *N. gonorrhoeae* strains, especially in parts of Asia and Africa, are now resistant to penicillin and require alternative treatments (see p. L-131) (112, 460, 482). Efforts to develop a gonorrhea vaccine are underway (508). One US pharmaceutical company is currently analyzing results of a clinical trial involving about 3,500 volunteers given either an experimental gonorrhea vaccine or a placebo. If the vaccine proves effective, the company will seek approval for large-scale production (682).

Some STD control programs are beginning to include PID. In the US, for instance, the Centers for Disease Control are promoting better management of PID cases by (1) educating physicians and other health care personnel about PID; (2) preparing and disseminating treatment guidelines; (3) encouraging careful follow-up of cases; and (4) encouraging referral and treatment for sexual partners of women with PID (92). In addition, the epidemiology of PID is being described and publicized (267, 529).

The most successful national STD control program has been in the People's Republic of China. In fact, China is the only country that claims to have eradicated syphilis and perhaps gonorrhea, even though STD rates were high when the communist regime took power in 1949 (66, 183, 456). STDs were controlled through a massive effort, begun in the early 1950s, that included (1) eliminating prostitution, (2) providing STD treatment in all health facilities, (3) educating people about the symptoms of STDs and the need for treatment, and (4) putting political and social pressure on the public and health workers to find all cases and see that they were treated (66, 243, 456). STD incidence has remained low since this campaign mainly because political and social pressures in China discourage premarital and extramarital sexual relationships.

Other Asian programs emphasize controlling STDs in prostitutes. It is estimated that contact with prostitutes accounts for as much as 90 percent of reported STD cases in many Asian countries (480). Some countries have few STD clinics but make periodic attempts to diagnose and treat prostitutes (480). One of the most effective programs is in Singapore. In 1976 a campaign began to educate people about STDs, to improve treatment (particularly of penicillin-resistant gonorrhea strains), to encourage treatment of all contacts of infected individuals, and to check and treat prostitutes regularly. By 1977 syphilis and gonorrhea rates in the general public had begun to drop (481, 482). The proportion of gonorrhea infections due to penicillin-resistant strains increased sharply between 1970 and 1979, however (482).


MAKE THIS DISH
THE SPECIALTY OF THE HOUSE
Serve Your Patient
By Doing a G.C. Culture
CONTROL P.I.D.

This poster aims to alert health professionals to the need for routine gonorrhea screening in order to help prevent PID. Swabs, usually from the cervix, are spread across culture medium in the pattern shown and later checked for growth of *N. gonorrhoeae*. (Courtesy of Arizona Department of Health Services)

Costa Rica and Cuba are the only other developing countries with comprehensive STD control programs. The Costa Rican program began in 1975 in response to an extremely high syphilis rate. The program emphasizes syphilis screening, treatment of common STDs, reporting of cases, and public health education (257). The Cuban program began in 1972, focusing on syphilis. In 1980 it expanded to include control of gonorrhea and associated PID (643). No recent data are available on the impact of these programs.

Where they exist, STD control efforts in African and South American countries generally are limited education, treatment, or screening programs. Efforts to examine and treat high-risk groups, such as prostitutes or servicemen, have been made in a number of countries but with limited and temporary impact (432, 607). Prenatal syphilis screening programs exist in a few countries, but often they reach only women attending specific clinics or hospitals (607).

A few African countries are setting up larger programs. In Zambia a policy for STD control was adopted in 1981. A major objective is to reduce the high rate of perinatal death due to congenital syphilis (41, 70, 231). The program is beginning with a pilot project to screen all women attending certain prenatal clinics in the city of Lusaka. Women with positive blood tests for syphilis will be treated, and their husbands contacted and treated if possible (41, 483). The Ministry of Health in Ethiopia, in conjunction with WHO and other agencies, also is undertaking a prenatal screening project because of the high rate of pregnancy wastage due to syphilis (685). The Central African Republic is expanding its STD control program. With WHO assistance, an STD clinic has been opened in the city of Bangui, and regional clinics are being established throughout the country (307). WHO also is working to increase communication among central African countries about the management and control of STDs (307).

How can countries with poor health conditions, limited health funding, and inadequate health facilities realistically approach STD control? The first step in most areas — after a brief assessment of the problem — is to improve diagnosis and treatment of STDs.

At present, STD management is inadequate in many areas. Where antibiotics are sold in retail outlets, people often buy whatever is available and treat themselves. For instance, in Nigeria a study of patients with nongonococcal urethritis found that half had taken at least three different antibiotics before visiting a clinic (17). Since people often buy the wrong antibiotics and stop taking the medication as soon as the symptoms disappear, self-treatment can lead to complications of the original infection and often promotes the development of antibiotic-resistant strains of STDs (17, 36, 607, 675).

Clinics also may treat STDs incorrectly. A Ugandan survey found that, in several health centers, gonorrhea often was inappropriately treated with several small doses of long-acting penicillin rather than the appropriate single dose — mainly because the practitioners did not understand how one injection could cure disease (33, 35). Also, since penicillin-resistant strains of gonorrhea are spreading rapidly in many areas (see box, p. L-131), clinics that continue to use only penicillin to treat gonorrhea risk treatment failures. The African Union Against the Venereal Diseases and Treponematoses recently suggested that, when penicillin fails in more than 10 percent of gonorrhea cases, programs need to "review and possibly change accepted regimens" to drugs effective against penicillin-resistant strains (683) (see Figure 7). Unfortunately, these drugs are usually more expensive than penicillin, and some cannot be given in single doses.

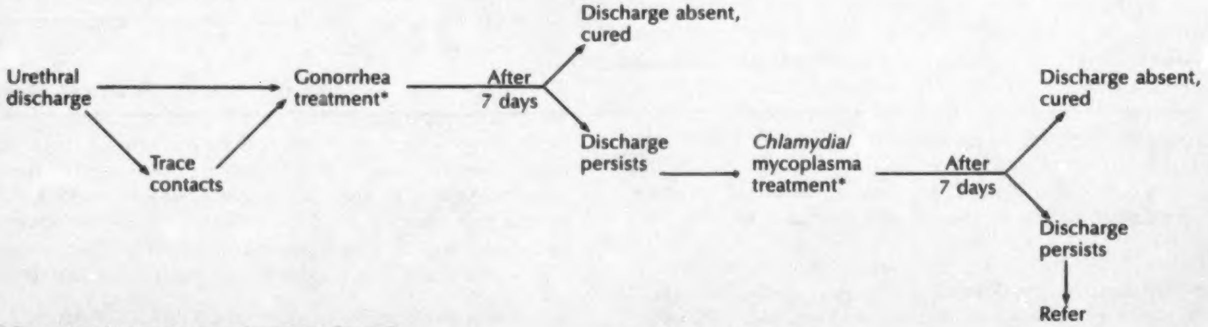
The most important step to improve STD care over the long run is training health care providers at all levels. Physicians may know little about STDs. In the US, for instance, medical students average less than a half hour of formal training on STDs in the four years of medical school (235). Formal and informal courses for all health workers, including pharmacists, are important, especially where STDs are a problem (641). Journal articles and professional meetings about STDs should be encouraged (27). Current issues in STD care, including updates on the prevalence of penicillin-resistant strains of gonorrhea, should be brought up in continuing education and in-service training programs. Pamphlets for pharmacists and pharmacy clerks may also be helpful.

Simple Treatment Protocols

Since 80 to 90 percent of people in developing countries live in rural or semirural areas, the burden of managing STDs will fall on the primary health care facilities that serve these areas (33). Most rural primary care facilities have little if any laboratory equipment to aid diagnosis, and the medical auxiliaries or pharmacists who staff them have limited medical training (33).

WHO has proposed that, in primary care centers without diagnostic facilities, STDs could be managed by simple treatment protocols based on the most common symptoms of STDs (381, 673, 693). When the symptom is urethral or vaginal discharge, these protocols involve treating for gonorrhea first (see Figures 8 and 9). For genital ulcers, patients in many African regions can be treated for both syphilis and chancroid first (693) (see Figure 10). Alternatively, treatment may depend on the appearance of ulcers: painless, well-rounded lesions are treated as syphilis; painful necrotic lesions, as chancroid; painful multiple vesicles, as herpes (381). If possible, patients are treated with a single-dose, inexpensive medication and told to return in seven days. If the symptoms are still present at follow-up, patients are treated for the most likely remaining cause — if urethral discharge, usually for nongonococcal urethritis; if vaginal discharge, often for trichomoniasis or, where it is common, for chlamydial infection (381). (See Figures 8 and 9.) Specific protocols

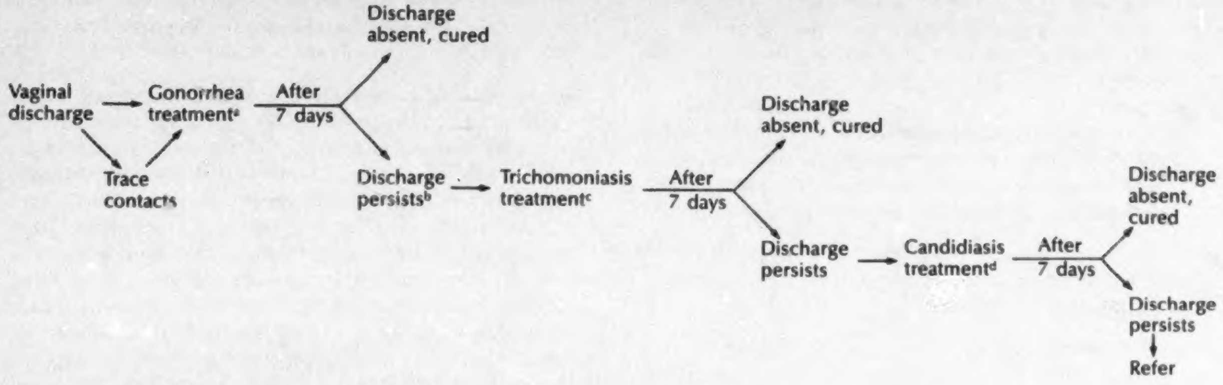
Figure 8. A Simple Treatment Protocol for Urethral Discharge for Use Where Laboratory Diagnosis Is Not Possible



* For appropriate treatment regimens, see Figure 7.

Source: adapted from Meheus, A. Management of patients with STD problems (practical approaches in developing nations). In: Holmes, K.K., Mardh, P.-A., Sparling, P.F., and Wiesner, P.J., eds. Sexually transmitted diseases. New York, McGraw Hill, 1983. (In press)

Figure 9. A Simple Treatment Protocol for Vaginal Discharge for Use Where Pelvic Examination and Laboratory Diagnosis Are Not Possible


Vaginal discharge
Gonorrhea treatment[a]
Trace contacts
After 7 days
Discharge absent, cured
Discharge persists[b]
Trichomoniasis treatment[c]
After 7 days
Discharge absent, cured
Discharge persists
Candidiasis treatment[d]
After 7 days
Discharge absent, cured
Discharge persists
Refer

[a] For appropriate treatment regimens, see Figure 7.

[b] In areas where chlamydial infections are common, *Chlamydia*/mycoplasma treatment may be the appropriate second step in this protocol.

[c] Metronidazole, 2 g orally (single dose). Not recommended during pregnancy (115, 669).

[d] Effective regimens include: Clotrimazole 100 mg intravaginally daily for 7 days or nystatin 100,000-1,000,000 units (depending on geographical area) intravaginally daily for 14 days (669, 673).

Source: adapted from Meheus, A. Management of patients with STD problems (practical approaches in developing nations) In: Holmes, K.K., Mardh, P.-A., Sparling, P.F., and Wiesner, P.J., eds. Sexually transmitted diseases. New York, McGraw Hill, 1983. (In press)

would vary from place to place depending on the relative incidence of various STDs and on the patients — for instance, whether they describe symptoms accurately, whether they return for follow-up, and whether genital examinations can be conducted (381, 669, 693). Treatments used would vary according to the availability and cost of various drugs, the likelihood of compliance with multidose regimens, and the incidence of penicillin-resistant strains of STDs (381, 669). These protocols should not replace thorough diagnosis and treatment techniques where such techniques are available. Where they are not available, however, these protocols can at least provide a basis for simple management of STDs.

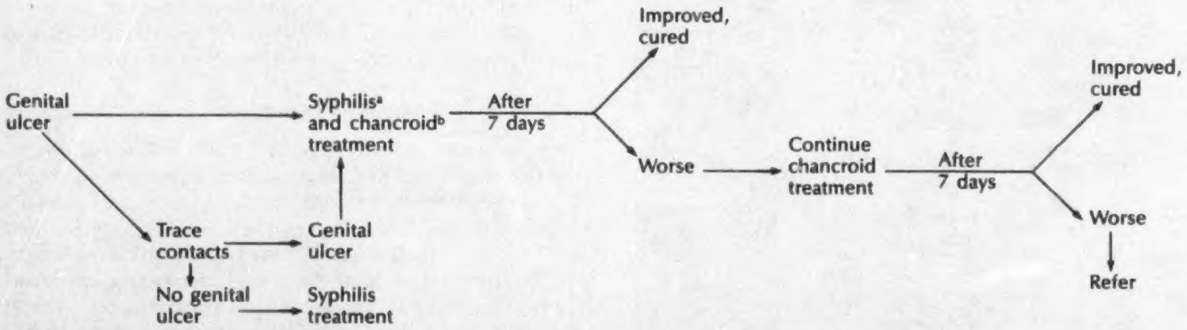
This type of simplified STD management was successful in a rural health center in Swaziland in 1978. All patients with urethral or vaginal discharge were treated for gonorrhea. Of 447 men with urethral discharge, 41 percent returned for follow-up after seven days. Five percent still had a discharge. All were then successfully treated for nongonococcal urethritis with tetracycline. The men identified 192 female contacts, 94 of whom were traced and treated. The cost, including treatment and tracing, was $.84 (US) per patient. Of 316 women with vaginal discharge, 38 percent required a follow-up treatment for trichomoniasis and 4 percent required a second follow-up treatment for candidiasis. One percent of the total had to be referred to a regional hospital (381, 693). In the Central African Republic a combined treatment regimen effective against the major causes of genital lesions — chancroid and syphilis — was used with all patients attending a Bangui clinic for genital lesions. No specific diagnoses were attempted. At follow-up 85 percent were cured (307).

Public STD Education Programs

Public education is crucial in any STD control program. It involves:

- informing the public about STDs — how they are transmitted and their long-term effects, especially PID and infertility;

Figure 10. A Simple Treatment Protocol for Genital Ulcers for Use Where Laboratory Diagnosis Is Not Possible


Genital ulcer
Syphilis[a] and chancroid[b] treatment
After 7 days
Improved, cured
Worse
Continue chancroid treatment
After 7 days
Improved, cured
Worse
Refer
Trace contacts
Genital ulcer
No genital ulcer
Syphilis treatment

[a] For appropriate treatment regimen, see Figure 7.

[b] Trimethoprim 80 mg/sulfamethoxazole 400 mg 2 tablets orally twice daily for 5 days or erythromycin 500 mg orally 3 times daily for 7 days (669). Limited data suggest that a single treatment of 8 tablets of trimethoprim 80 mg/sulfametrole 400 mg also is effective (669, 683).

Source: adapted from World Health Organization and Pan American Health Organization. Scientific Group on Sexually Transmitted Disease Control. Control of sexually transmitted diseases. [Report of a meeting, Washington, DC., April 26-30, 1982] (Draft) 1983.

- informing people that limiting the number of sexual partners minimizes the risk of acquiring an STD and, if they have an STD, that sexual contact should be completely avoided or condoms used during coitus;
- encouraging men and women at risk to use contraceptives that protect against STDs or PID (see p. L-141);
- assuring that people know where to go for appropriate STD treatment and that all patients, especially men, understand the importance of telling sexual partners about the need for treatment.

Obviously, the impact of public education depends greatly on the availability of appropriate contraceptives and, most importantly, treatment facilities.

The need for STD education is great. Most people know little about how STDs are transmitted, what their symptoms are, or what long-term risks they pose (27, 99, 307, 414, 468, 607, 658). Few men realize that they should avoid sexual contacts during any genital infection or understand the health risks for women exposed to infection (34). In some rural areas of central Africa urethral discharge is thought to be a sign of puberty rather than a symptom of disease (36). In Ethiopia a common belief is that syphilis can be "weakened" and cured by having many sexual contacts (468). In Nairobi a survey of 200 relatively well-educated women attending a family planning clinic found almost total ignorance of the harmful effects of STDs and of ways to prevent STDs (240). In Madras, India, a survey of 200 men and women living in a slum found that less than one-quarter understood how STDs are transmitted or what the symptoms are. Women were particularly ill-informed (575).

The emphasis and approach of an STD education program must vary according to the population at greatest risk. Efforts should always be aimed at both men and women, however. If, as in some developing countries, the at-risk population is made up of low-income, nonliterate young adults, then radio or cinema messages emphasizing the importance of prevention and prompt treatment may be most appropriate. Where adolescents in school are particularly at risk, as in the US and many European countries (247, 298), in-school education may be appropriate. It may be controversial, however, and usually must be preceded by efforts to win support from parents and community groups (225, 488, 658). (See **Population Reports**, *Population Education in the Schools*, M-6, March-April 1982.)

Workers at health posts like this one in Peru can be trained to treat STDs using simple protocols based on common symptoms. (Julie Vizcarra/PAHO)

Where funding is very limited, education should be directed at particularly high-risk groups such as prostitutes, men and women attending STD clinics, or others especially likely to have multiple sexual partners (27, 577). STD clinics can provide information to patients through posters, brochures, and, above all, through personal counseling by health personnel (27). Condom distribution and education about the protective effects of condoms, diaphragms, spermicides, and oral contraceptives should be emphasized in all STD treatment facilities. Where medication is available without prescriptions, pharmacists and pharmacy clerks should be given some training and simple illustrated materials for distribution.

Little is known about the impact of education programs on behavior, mainly because education is usually part of overall STD control programs and thus is not evaluated separately. Also, the desired behavioral changes — limiting the number of sexual partners, using condoms, and/or attending STD clinics — are affected by many other factors and are difficult to measure (298).

One Ugandan study did try to estimate the effects of STD education on behavior. Almost all male and female university students who attended a one-hour talk on STDs said immediately afterward that they would be more cautious about sexual contacts. Among men who attended the talk and who later sought STD treatment at the university clinic, however, the only clear change in behavior was that they reported for treatment earlier. The study could not determine whether the talk helped some people avoid STDs so that they did not need to come to the clinic (34).

In Sweden a nationwide public education program promoting condom use for protection against STDs may have helped lower the gonorrhea rate. The National Association for Sex Education began a condom promotion campaign in 1970 as part of an STD control effort involving the government, the schools, and private organizations. The campaign used posters, cartoon strips, point-of-purchase displays, and short films. At the same time, the schools began sex education programs. Within two years the number of condoms sold had increased by 50 percent. The incidence of gonorrhea had dropped by 20 percent. How much of this drop was due to increased condom use is not known. The increased number of treatment facilities also could have helped lower the gonorrhea rate (636).

Improving Obstetric Care

Improving obstetric care is difficult and calls for appropriate training of health care providers. These include traditional midwives, community health nurses, and formally trained midwives as well as physicians (464). Most in need of training are traditional midwives, often called traditional birth attendants (TBAs). In many developing countries TBAs deliver between 60 and 80 percent of babies (89, 357, 632, 666). This pattern continues partly because of a lack of trained personnel but also because some women prefer TBAs to trained medical personnel (see **Population Reports**, *Traditional Midwives and Family Planning*, J-22, May 1980). Thus, improving obstetrical care requires upgrading the skills of those currently providing care as well as training new generations of health care providers.

Many developing countries, including Ecuador, Honduras, Sierra Leone, the Philippines, and Thailand, have set up TBA training programs (45, 356, 358, 590, 645). Others, such as Sudan, have developed formal programs to train young women to become village midwives and eventually replace the TBAs (213). Since the majority of TBAs are nonliterate women in their 40s and 50s, training programs for them use very simple teaching techniques with emphasis on practical skills. Courses describe when to refer patients with complications to a medical facility and emphasize basic hygienic practices such as washing hands. Most cover elementary prenatal and postnatal care. Training courses usually provide TBAs with simple delivery kits (357).

How successful TBA training programs are is unclear. In Honduras a 1977 evaluation suggested that trained TBAs referred more patients with complications than did untrained TBAs. Many TBAs continued to use unsafe practices, however (358). In Sierra Leone a study of TBA practices before and after training revealed that many TBAs reverted to traditional practices a few months after training (645). In Thailand a 1978 study tested knowledge of maternal and child health care and family planning on the part of trained and untrained TBAs. Trained TBAs were somewhat more likely than untrained TBAs to choose the correct answers (590). No large studies have yet compared the health or fertility of women attended by briefly trained TBAs or trained nurses with the health or fertility of those treated by untrained TBAs.

One barrier to improving obstetric care is mutual distrust between the medical profession and TBAs (559). In some areas, however, TBAs and physicians have begun to work together. In Taiwan TBAs often assist young obstetricians in setting up new practices as well as joining in partnerships with them at "birth stations" (273). In Guaíuba, a small town near Fortaleza, Brazil, TBAs were invited to attend deliveries at small birth stations where nurses and transportation to a hospital were always available (472, 684). The success of the Guaíuba project has prompted similar efforts elsewhere in Brazil (684).

THE ROLE OF FAMILY PLANNING PROGRAMS

Family planning programs can help to prevent infertility and, in some cases, can provide basic infertility services (221). By providing contraceptives such as condoms, diaphragms, spermicides, and oral contraceptives, family planning programs can help men and women protect themselves and their partners from sexually transmitted diseases and/or pelvic inflammatory diseases. By making all contraceptives readily available, family planning programs can reduce the incidence of illegal abortion, complications of which can lead to infertility. Many family planning clinics also can diagnose and treat STDs and thus help reduce the rate of PID and other complications of untreated STDs. Some may be able to offer basic infertility services so that infertile couples can obtain an initial evaluation at minimal cost.

Providing Contraceptives

Increasing the availability of contraceptives can help to prevent infertility in two ways: (1) by offering contraceptives that protect against infection as well as pregnancy and (2) by giving women who want to control their fertility a choice other than illegal abortion.

Condoms, when used throughout all sexual contact, effectively protect against gonorrhea and syphilis and probably other STDs as well (see **Population Reports**, *Update on Condoms: Products, Protection, Promotion*, H-6, September-October 1982). A study in a London STD clinic found that men who used condoms regularly and correctly were one-tenth as likely to contract gonorrhea or syphilis as men who did not use condoms. Even men who used condoms irregularly or incorrectly were 80 percent as likely to contract an STD (47). Family planning and STD programs need to place more emphasis on the value of regular condom use in preventing STDs and potential infertility (554).

Diaphragms may provide both a mechanical and chemical barrier to infection since they are normally used with a spermicide. In the US an investigation of over 2,000 women attending a Louisiana family planning clinic found that women who used diaphragms or whose husbands used condoms had cervical gonorrhea about one-fifth as often as users of oral contraceptives (OCs) or IUDs (278). Diaphragms require fitting by a physician or paraprofessional, however, and so may not be available to many women.

Spermicides, although not as effective in preventing pregnancy as diaphragms or condoms, are often readily available in retail stores and kill most organisms that cause STDs (109, 127, 138, 259, 471, 560). A recent US study found that spermicide users had a gonorrhea rate one-fourth that of users of oral contraception or voluntary sterilization (259). As with condoms and the diaphragm, spermicides protect best when used correctly and consistently (see **Population Reports**, *Spermicides — Simplicity and Safety are Major Assets*, H-5, September 1979).

By protecting against STDs, condoms, diaphragms, and spermicides also protect against PID. A case-control study of 306 PID patients and over 1,175 controls found that condom users faced 70 percent the risk of PID as nonusers; spermicide users, 60 percent; and diaphragm users, 40 percent (279). A recent study suggests that bacteria may attach to sperm and thus be carried to the uterus and fallopian tubes (609). This would help explain the protective effect of barrier methods against PID.

Oral contraceptives, as well as being highly effective for contraception, protect women against PID (442, 524, 546). Women who have used OCs for 12 months or longer face about half as much risk of developing PID as noncontracepting women (524, 648). Thickened cervical mucus in OC users may prevent bacteria from ascending through the cervix (162, 292, 648). There is no evidence that OCs protect against STDs, however. Women who are given OCs should be told that, although conception may be delayed for a few months after discontinuing pills, it is not permanently prevented (331).

Long-acting progestins — injectables, implants, and others — may also help prevent PID. A recent WHO case-control study found that women using the injectable contraceptive Depo-Provera (depot medroxyprogesterone acetate) were less likely to develop PID than women using no contraception (203).

IUDs increase the risk of PID, especially in women who are exposed to STDs. Studies suggest that IUD users are about 1.5 to 4 times more likely to develop PID than noncontraceptors (98, 211, 546, 648). Risk associated with IUD use is greater among women who have a number of sexual partners (162, 447), possibly because of greater potential for exposure to STDs. The reason for greater risk with IUD use is not certain. Bacteria may grow more rapidly in the fallopian tubes because of inflammation due to the IUD; the increased volume and duration of menstrual bleeding may promote bacterial growth; bacteria may ascend through the cervix more easily when an IUD is in place; and/or bacteria may be introduced into the uterus during IUD insertion (see **Population Reports**, *IUDs: An Appropriate Contraceptive for Many Women*, B-4, July 1982). A recent study shows that infections most often occur in the first few months after insertion, suggesting that the last explanation is most important (687).

Complications of poorly performed illegal abortions, including pelvic infection and infertility, are a common problem in developing countries where family planning services are limited. The ready availability of contraceptives may reduce the number of abortions in these areas. In Chile, as the figures below show, abortion complications declined as family planning use increased (253, 439):

	Early 1960s	1978
% using contraception	5%	25%
Abortion deaths per 1,000 live births	12	4
Abortion hospitalizations per 1,000 women age 15-44	25	15

Where nationwide family planning programs are not yet established, programs intended to reduce abortion complications may concentrate on providing contraceptives to women most likely to seek abortions. These women vary from region to region. In many Asian and South American countries older, married women with many children make up the bulk of those undergoing abortions. By contrast, in many African countries young, unmarried women undergo abortions more than other women (332). One African physician comments that in some areas of Africa simply assuring that school girls are aware of contraceptives and where to obtain supplies may be a step toward preventing abortion (435).

YOU.
...YES, YOU,
EVEN YOU
CAN GET
V.D.
...YES!!
The Family Planning Association of Trinidad & Tobago
Depts. of Information & Education:

Where STDs are a problem, family planning organizations should inform their clients of the symptoms, risks, and sources of treatment. Many clinics may be able to diagnose and treat common STDs.

STD and Infertility Services

Providing STD diagnosis and treatment is a logical extension for many family planning programs. In some developed and developing countries, family planning programs may be the only source of medical care for many young, sexually active women. Also, family planning clinics often are the only available facilities that routinely perform genital and pelvic examinations (240). Thus, in areas where STDs are common, family planning clinics could diagnose and treat STDs and screen for asymptomatic STD infection. This would require appropriate facilities and training, however. Also, clinics would have to encourage men as well as women to attend — an approach important for family planning as well as for preventing infertility.

Some family planning clinics and regional health centers may be able to help couples with infertility problems (120, 221, 251, 287, 315). In many developing countries infertility services are available only at a few, hospital-based clinics. Thus the majority of infertile couples have little opportunity even for a diagnosis. Those who can attend a clinic often have to wait a long time for basic tests. For instance, in Ibadan, Nigeria, women may wait six months to a year for hysterosalpingography (301).

In most family planning clinics, infertility services must be limited to procedures that do not require expensive equipment and can be performed by paraprofessionals rather than physicians. In the US, federally funded family planning clinics are required to offer infertility services. Officials note, however, that:

> Designing and implementing a comprehensive infertility program is a major undertaking for a family planning program that has worked primarily to prevent unwanted pregnancies. The responsibilities of contraceptive and infertility programs are so dissimilar that careful planning, assessment of needs, and ongoing evaluation of the program and resources available in the community are essential before even the most effective, experienced family planning service provider can launch a successful infertility program. (621)

Some simple procedures that could be offered include:

- counseling couples on fertility awareness — when and how often coitus should take place to maximize the chance of pregnancy,
- obtaining medical histories from both husband and wife,
- performing physical examinations of both husband and wife,
- checking couples for asymptomatic STD infections that could cause subfertility,
- determining whether ovulation takes place, using basal body temperature and/or cervical mucus records,
- performing semen analyses,
- counseling couples with potentially serious fertility problems about their options for further treatment and the anticipated long-term costs and chances for success.

Couples who are subfertile because of relatively simple problems such as asymptomatic cervicitis or improper timing of coitus could become pregnant with the help of such services. In the US, family planning clinics in rural Pennsylvania cooperated to develop a multilevel infertility service in the late 1970s (402, 589). The family planning clinics provided simple services, including postcoital tests, semen analyses, endometrial biopsies, clomiphene citrate therapy, and artificial insemination by husband. More complex problems were referred to higher levels. Some 44 percent of 112 couples seen during a 2-year period could be diagnosed, and one-third achieved pregnancy without referral to more sophisticated facilities (589). The cost per couple was $268 (US) — far less than hospital-based investigations would have been.

In many developing countries, family planning clinics that start basic infertility services may find their clientele substantially increased. In Sri Lanka, for instance, when the Family Planning Association Mothers' Welfare Clinics began providing infertility services, infertility patients soon outnumbered family planning clients (120). In central African countries where infertility levels are high, any clinic that offers infertility services may face heavy demand and will need to set priorities. Clearly, childless couples who have been attempting pregnancy for more than one or two years should be treated before couples who have a number of children but want more (551). What share of resources will be devoted to infertility diagnosis and treatment and what share to family planning also will have to be decided.

In some areas concern about infertility may prevent some couples from using family planning (65, 170, 498, 501). Thus, in the long run, providing basic STD and/or infertility services may be one way to attract more family planning clients (101, 287, 370).

The Permanently Infertile Couple

About half of all infertile couples will not be able to have a child of their own, even after months or years of therapy. These couples often need help in accepting their infertility and in considering options other than childbearing.

There are three ways that health workers can help permanently infertile couples. They can:

- help couples to accept their infertility so that they do not continue to spend time and money fruitlessly seeking a cure,
- counsel couples in whom male factors cause infertility about artificial insemination with a donor's sperm,
- advise couples interested in adopting a child of the local regulations and procedures.

Infertile couples, especially childless couples, often find it difficult to accept their infertility and to begin thinking about adoption, artificial insemination, or remaining childless (338, 543). These couples need accurate, realistic information about their infertility prognosis. Also, they often need help in dealing with lack of understanding on the part of relatives and the community. Physicians and counselors can help simply by listening and responding sympathetically to couples' concerns (287, 543). In the US a nationwide organization, RESOLVE, offers counseling, referral, and support to people with infertility problems through telephone information services, a bimonthly newsletter, and other services and publications (388, 491).

When the man is sterile, some couples may choose to try having a child through artificial insemination by donor. The procedure is the same as for AIH (see p. L-133), except that donor sperm is used. The sperm donor is usually a man of ethnic and physicial make-up similar to the infertile man's. Success rates in healthy women under age 35 usually are relatively high — between 50 and 80 percent within 3 to 12 cycles of insemination (167, 168, 638). The major problem is that artificial insemination by donor is not accepted in some cultures and religions. Roman Catholicism and Orthodox Judaism consider it to be adultery (389). In many African cultures it may be unacceptable, although O.A. Ladipo reports that his patients in Ibadan, Nigeria, have accepted the procedure after counseling (302). In India infertile couples have readily accepted artificial insemination (479).

Crowded health centers may be hard pressed to provide basic infertility services in areas where infertility is common. (US AID)

Adoption is the only way for most permanently infertile couples to have children. In developed countries children are usually adopted through public or private adoption agencies. Adoptions must be approved by the courts and by social welfare agencies (473). In most countries the supply of children to be adopted is not nearly enough to meet the demand (389, 473).

In most developing countries adoption is less regulated than in developed countries. In many Polynesian societies, for example, adoption simply involves parents agreeing to give an infant to a neighbor or relative who is infertile or who has no small children. The biological parents retain many rights to their child, however (81, 507). In India the 1956 Hindu Adoptions and Maintenance Act allows any Hindu man to adopt a son if he does not already have a son or to adopt a daughter if he does not already have a daughter. A Hindu woman, however, may adopt a child only if her husband has abandoned her, is dead, or is of "unsound mind" (69). In Indonesia private hospitals may arrange for the adoption of unwanted babies (569). In Africa formal adoption is rare. Motherless children or children born out of wedlock usually are absorbed into extended families. Even when adoptable children are available, infertile couples may not accept adoption because they see adopting a child as a public admission of their infertility (302).

Infertility can be a source of suffering to women and men the world over. Therefore, wherever infertility is common, it is important to develop public health approaches to prevent infertility, to establish health facilities to diagnose and, when possible, treat infertile couples, and to develop ways for permanently infertile couples to adopt children (12).

BIBLIOGRAPHY

Asterisk (*) designates an article that was of particular value in the preparation of this issue of **Population Reports**.

1. ANONYMOUS. Alcohol, marijuana damage male's reproductive system. Ob. Gyn. News 17(19): 13. October 1-14, 1982.

2. ANONYMOUS. Asymptomatic mycoplasma tied to pregnancy wastage. Ob. Gyn. News 7(16): 1, 17. August 15-31, 1982.

3. ANONYMOUS. CDC writes first guidelines for sexually transmitted diseases. Contraceptive Technology Update 3(10): 129-134. October 1982.

4. ANONYMOUS. Desirable births. People 6(1): 16-17. 1979.

5. ANONYMOUS. Fertility myths: childless couples pray to the moon, stars. IMCH Newsletter 13(150): 1. May 1982.

6. ANONYMOUS. OSHA issues new guidelines on lead. Planned Parenthood-World Population Washington Memo, December 7, 1979. p. 2.

7. ANONYMOUS. Test-tube twins are born in U.S. Washington Post, March 25, 1983. p. A-17.

8. ABDEL AAL, H., ATRIBI, A. EL-, ABDEL HAFIZ, A., and AIDAROS, M. Azoospermia in bilharziasis and the presence of sperm antibodies. Journal of Reproductive Fertility 42(3): 403-406. March 1975.

9. ABDEL FATTAH, A., ABDEL AZIM, A., HABEIB, M., and RAFIK, M. Studies on infertility in males. Fertility and Sterility 33(2): 157-159. February 1980.

10. ACOSTA, A.A., BUTTRAM, V.C., Jr., BESCH, P.K., MALINAK, L.R., FRANKLIN, R.R., and VANDERHEYDEN, J.D. A proposed classification of pelvic endometriosis. Obstetrics and Gynecology 42(1): 19-25. July 1973.

*11. ADADEVOH, B.K., ed. Sub-fertility and infertility in Africa. Ibadan, Nigeria, Caxton Press, 1974. 113 p.

12. ADADEVOH, B.K. Sub-fertility and infertility in Africa. In: Sai, F.T., ed. Family welfare and development in Africa. London, International Planned Parenthood Federation, 1977. p. 80-84.

13. ADAMSON, G.D., FRISON, L., and LAMB, E.J. Endometriosis: studies of a method for the design of a surgical staging system. Fertility and Sterility 38(6): 659-666. December 1982.

14. ADLER, M.W. Trends for gonorrhea and pelvic inflammatory disease in England and Wales and for gonorrhea in a defined populaton. American Journal of Obstetrics and Gynecology 138(7, Pt. 2): 901-904. December 1, 1980.

15. ADLER, M.W., BELSEY, E.H., and O'CONNOR, B.H. Morbidity associated with pelvic inflammatory disease. British Journal of Venereal Diseases 58: 151-157. 1982.

16. ALAUSA, O. and OSOBA, A.O. The role of sexually transmitted diseases in male infertility in tropical Africa. Nigerian Medical Journal 8(3): 225-229. May 1978.

17. ALAUSA, O., OSOBA, A.O., and SOGBETUN, A.O. Abuse of chemotherapeutic agents among patients with urethritis. Journal of Medical and Pharmaceutical Marketing 3(2): 8-10. 1975.

18. ALEXANDER, N., ANSBACHER, R., SAMUEL, T., and TUNG, K.S.K. When you suspect infertility is immunologic. Contemporary Ob/Gyn 14(5): 92-113. November 1979.

19. ALEXANDER, N.B. and COTANCH, P.H. The endocrine basis of infertility in women. Nursing Clinics of North America 15(3): 511-524. September 1980.

20. AMELAR, R.D. and DUBIN, L. Other factors affecting male fertility. In: Amelar, R.D., Dubin, L., and Walsh, P.C., eds. Male infertility. Philadelphia, W.B. Saunders, 1977. p. 69-101.

21. AMELAR, R.D., DUBIN, L., and SCHOENFELD, C. Sperm motility. Fertility and Sterility 34(3): 197-215. September 1980.

22. AMELAR, R.D., DUBIN, L., and WALSH, P.C., eds. Male infertility. Philadelphia, W.B. Saunders, 1977. 258 p.

23. AMERICAN FERTILITY SOCIETY (AFS). How to organize a basic study of the infertile couple. Birmingham, Alabama, AFS, [1978]. 25 p.

24. AMPOFO, D.A. The dynamics of induced abortion and the social implication for Ghana. Ghana Medical Journal 9(4): 295-302. December 1970.

*25. AMPOFO, D.A. Socio-cultural and medical perspectives of infertility in Ghana: epidemiological characteristics of 202 cases. In: Sai, F.T., ed. Family welfare and development in Africa. London, International Planned Parenthood Federation, 1977. p. 96-102.

26. ANSBACHER, R. Sperm-agglutinating and sperm-immobilizing antibodies in vasectomized men. Fertility and Sterility 22(10): 629-632. October 1971.

*27. ANTAL, G.-M., CANAPERIA, G., CAUSSE, G., OLSEN, G., PARIJS, L. VAN, and WILLCOX, R. Social and health aspects of sexually transmitted diseases. Geneva, World Health Organization (WHO), 1977. (WHO Public Health Papers No. 65) 56 p.

28. ARCE, B. and PADRON, S. Spermatogenesis in Klinefelter's syndrome. Reproducción 4(2): 177-184. April-June 1980.

29. ARCHIBALD, H.M. The influence of malarial infection of the placenta on the incidence of prematurity. Bulletin of the World Health Organization 15: 842-845. 1956.

*30. ARMAGNAC, C. and RETEL-LAURENTIN, A. Relations between fertility, birth intervals, foetal mortality and maternal health in Upper Volta. Studies in Family Planning 35(2): 217-234. July 1981.

31. ARMON, P.J. Maternal deaths in the Kilimanjaro region of Tanzania. Transactions of the Royal Society of Tropical Medicine and Hygiene 73(3): 284-288. 1979.

32. ARYA, O.P. Changing patterns in the organization of the venereal diseases and treponematoses service in Uganda. British Journal of Venereal Diseases 49(2): 134-138. 1973.

33. ARYA, O.P. and BENNETT, F.J. Role of the medical auxiliary in the control of sexually transmitted disease in a developing country. British Journal of Venereal Diseases 52(2): 116-121. April 1976.

34. ARYA, O.P. and BENNETT, F.J. VD control: a case study of university students in Uganda. International Journal of Health Education 17(1): 53-65. 1974.

35. ARYA, O.P. and BOSA, C.B. In search of an ideal single-session penicillin schedule for the treatment of gonorrhoea in Uganda. British Journal of Venereal Diseases 49(5): 460-463. October 1973.

*36. ARYA, O.P. and LAWSON, J.B. Sexually transmitted diseases in the tropics: epidemiological, diagnostic, therapeutic, and control aspects. Tropical Doctor 7(2): 51-56. April 1977.

37. ARYA, O.P., OSOBA, A.O., and BENNETT, F.J. Tropical venereology. Edinburgh, Churchill Livingstone, 1980. 234 p.

38. ARYA, O.P. and TABER, S.R. Maladies vénériennes et fécondité dans les régions rurales de l'Ouganda. [Venereal diseases and fertility in rural Uganda.] [FRE] 1975. (WHO/VDT/75.400; WHO/VDT/RES 75.339; WHO/VDT/RES/GON/75.96) 21 p. (Mimeo)

*39. ARYA, O.P., TABER, S.R., and NSANZE, H. Gonorrhea and female infertility in rural Uganda. American Journal of Obstetrics and Gynecology 138(7, Pt. 2): 929-932. December 1, 1980.

40. ASSAAD, M.B. Female circumcision in Egypt: social implications, current research, and prospects for change. Studies in Family Planning 11(1): 3-16. January 1980.

41. ATTILI, R.V., MHANGO, C., NYAYWA, S.L., NJELESANI, and KAPUMBA. Prevention of congenital syphilis and other adverse pregnancy outcomes due to syphilis: a demonstration project proposal. [1982]. 8 p. (Unpublished)

42. AZIZ, F.A. Gynecologic and obstetric complications of female circumcision. International Journal of Gynaecology and Obstetrics 17(6): 560-563. 1980.

43. BAASHER, T. Female circumcision and women's health. Draper Fund Report, No. 9, October 1980. p. 19-20.

44. BAIRD, D.T. Endocrinology of female infertility. British Medical Bulletin 35(2): 193-198. May 1979.

45. BAQUERO, H., SOSA, R., BAQUERO, R., and PINTO, E. Ecuador: TRA training programme, supervision, evaluation, and follow-up services. In: Mangay-Maglacas, A. and Pizurki, H., eds. The traditional birth attendant in seven countries: case studies in utilization and training. Geneva, World Health Organization, 1981. p. 9-26.

46. BARBER, H.R.K. The effect of cancer and its therapy upon fertility. International Journal of Fertility 26(4): 250-259. 1981.

47. BARLOW, D. The condom and gonorrhoea. Lancet 2(8042): 811-812. October 15, 1977.

48. BARNS, T.E.C. Obstetrics in the third world with particular reference to field research into delivery of maternal care to the community. In: Stallworthy, J. and Bourne, G., eds. Recent advances in obstetrics and gynaecology. No. 13. New York, Churchill Livingstone, 1979. p. 109-136.

*49. BARTEN, J. Screening for infertility in Indonesia: results of examination of 863 infertile couples. [ENG, summary in GER] Andrologia 10(5): 405-412. September-October 1978.

50. BECKMAN, L.J. Women alcoholics: a review of social and psychological studies. Journal of Studies on Alcohol 36(7): 797-824. July 1975.

51. BEER, A.E. and NEAVES, W.B. Antigenic status of semen from the viewpoints of the female and male. Fertility and Sterility 29(1): 3-22. January 1978.

52. BEGUM, S.F. Pelvic infections following gynecologic procedures in Bangladesh. American Journal of Obstetrics and Gynecology 138(7, Pt. 2): 875-876. December 1, 1980.

53. BELKER, A.M. The varicocele and male infertility. Urologics Clinics of North America 8(1): 41-51. February 1981.

54. BELSEY, M.A. Biological factors other than nutrition and lactation which may influence natural fertility: additional notes with particular reference to sub-Saharan Africa. [ENG, summary in FRE] In: Leridon, H. and Menken, J., eds. Natural fertility. Fécondité naturelle. Liège, Belgium, Ordina Editions, 1979. p. 255-272.

*55. BELSEY, M.A. Epidemiologic aspects of infertility. In: Holmes, K.K. and Mårdh, P.-A., eds. International perspectives on neglected sexually transmitted diseases. Washington, D.C., Hemisphere Publishing, 1983. p. 269-297.

*56. BELSEY, M.A. The epidemiology of infertility: a review with particular reference to sub-Saharan Africa. Bulletin of the World Health Organization 54(3): 319-341. 1976.

57. BELSEY, M.A., ELIASSON, R., GALLEGOS, A.J., MOGHISSI, K.S., PAULSEN, C.A., and PRASAD, M.R.N., eds. Laboratory manual for the examination of human semen and semen-cervical mucus interaction. Singapore, Press Concern, 1980. 43 p.

58. BEN-DAVID, M. and SCHENKER, J.G. Human ovarian receptors to human prolactin: implications in infertility. Fertility and Sterility 38(2): 182-186. August 1982.

59. BENNETT, F.J. Gonorrhoea: a rural pattern of transmission. East African Medical Journal 41(4): 163-167. April 1974.

60. BENNETT, F.J. The social determinants of gonorrhea in an East African town. East African Medical Journal 39(6): 332-342. June 1962.

61. BERGER, R.E. Acute epididymitis. [Editorial] Sexually Transmitted Diseases 8(4): 286-289. October-December 1981.

62. BERGER, R.E., ALEXANDER, E.R., HARNISCH, J.P., PAULSEN, C.A., MONDA, G.D., ANSELL, J., and HOLMES, K.K. Etiology, manifestations and therapy of acute epididymitis: prospective study of 50 cases. Journal of Urology 121(6): 750-754. June 1979.

63. BERGER, R.E., ALEXANDER, E.R., MONDA, G.D., ANSELL, J., MCCORMICK, G., and HOLMES, K.K. *Chlamydia trachomatis* as a cause of acute "idiopathic" epididymitis. New England Journal of Medicine 298(6): 301-304. February 9, 1978.

64. BERGH, T., NILLIUS, S.J., and WIDE, L. Bromocriptine treatment of 42 hyperprolactinaemic women with secondary amenorrhoea. Acta Endocrinologica 88(3): 435-451. July 1978.

65. BERGSTROM, S. Fertility and subfertility as health problems: population control versus family planning by the family. In: Bondestam, L. and Bergstrom, S., eds. Poverty and population control. New York, Academic Press, 1980. p. 39-59.

66. BEST, J.B. Impressions of Chinese medical services. Eastern Horizon 6(10): 32-35. October 1967.

67. BETTENDORF, G., LEHMANN, F., and LEIDENBERGER, F. Hormonal treatment of female infertility. In: Diczfalusy, E., ed. Regulation of human fertility. Proceedings of the World Health Organization Symposium on Advances in Fertility Regulation, Moscow, November 16-19, 1976. Copenhagen, Scriptor, 1977. p. 155-179.

68. BEWES, P.C. Urethral stricture. Tropical Doctor 3(2): 77-81. April 1973.

69. BHALLA, C.K. Adoption: medical and legal aspects. Indian Pediatrics 15(6): 523-527. June 1978.

70. BHAT, G.J., HIRA, S.K., RATNAM, A.V., SEHGAL, D., CHINTU, C., and MULENGA, R.C. Congenital syphilis in Lusaka: 3. Incidence in the neonatal intensive-care unit. East African Medical Journal 59(6): 374-378. June 1982.

71. BHATIA, S. Traditional childbirth practices: implications for a rural MCH program. Studies in Family Planning 12(2): 66-76. February 1981.

72. BIRKELAND, S.A. and KRISTOFFERSEN, K. Primary sterility of unknown causes: some possible immunological causes. Infertility 3(3-4): 251-261. 1980.

73. BLACKER, J.G.C. Population growth and differential fertility in Zanzibar Protectorate. Population Studies 15(3): 258-266. March 1962.

74. BLAND, K.G. and GELFAND, M. The effects of schistosomiasis on the fallopian tubes in the African female. Journal of Obstetrics and Gynaecology of the British Commonwealth 77(11): 1024-1027. November 1970.

*75. BONGAARTS, J. Does malnutrition affect fecundity? A summary of evidence. Science 208(4444): 564-569. May 9, 1980.

*76. BONGAARTS, J. Infertility after age 30: a false alarm. Family Planning Perspectives 14(2): 75-78. March-April 1982.

77. BONGAARTS, J. Involuntary childlessness with increasing age. Research in Reproduction 14(4): 1-2. October 1982.

78. BONGAARTS, J. Not so unresolved: a reply. Family Planning Perspectives 14(5): 289-290. September-October 1982.

79. BONGAARTS, J. and DELGADO, H. Effects of nutritional status on fertility in rural Guatemala. [ENG, summary in FRE] In: Leridon, H. and Menken, J., eds. Natural fertility. Fécondité naturelle. Liège, Belgium, Ordina Editions, 1979. p. 109-133.

80. BOTELLA-LLUSIA, J. The polycystic ovary syndrome: a reappraisal. Infertility 2(2): 117-133. 1979.

81. BOURGEOIS, M. and MALARRIVE, J. Fa'a'mu et Fanau: de quelques aspects traditionnels et problèmes actuels de l'adoption et du don d'enfants en Polynésie française. [Fa'a'mu and Fanau: various traditional aspects and current problems of adoption and donation of children in French Polynesia.] [FRE, summary in ENG] Annales Médico-Psychologiques 1(5): 721-737. May 1976.

82. BOWIE, W.R. Etiology and treatment of nongonococcal urethritis. Sexually Transmitted Diseases 5(1): 27-33. January-March 1978.

83. BOYCE, W.H. Infections and diseases of the scrotum and its contents. In: Campbell, M.F., ed. Urology (Vol. 1). Philadelphia, W.B. Saunders, 1963. p. 572-641.

84. BRACKEN, M.B. and HOLFORD, T.R. Exposure to prescribed drugs in pregnancy and association with congenital malformations. Obstetrics and Gynecology 58(3): 336-344. September 1981.

85. BRAUNSTEIN, G.D., DAHLGREN, J., and LORIAUX, D.L. Hypogonadism in chronically lead-poisoned men. Infertility 1(1): 33-51. 1978.

86. BREELAND, E., COHEN, M.S., WARNER, R.S., and LEITER, E. Epididymal obstruction in azoospermic males. Infertility 4(1): 49-66. 1981.

87. BROSENS, I., KONINCKX, P., and BOECKX, W. Endometriosis. Clinics in Obstetrics and Gynaecology 8(3): 639-651. December 1981.

88. BROWN, I. Maternal mortality: a survey of maternal deaths occurring during 1976. Central African Journal of Medicine 24(10): 212-214. October 1978.

89. BROWN, I.M. Perspectives in obstetric care for Zimbabwe. Central African Journal of Medicine 27(3): 37-41. March 1981.

90. BROWN, J.C. Psychological and dietary aspects of secondary amenorrhoea. In: Morris, N., ed. Psychosomatic medicine in obstetrics and gynaecology. Basel, Switzerland, S. Karger, 1972. p. 579-581.

91. BROWN, S.T. [US Centers for Disease Control] [Gonorrhea transmission] Personal communication, April 28, 1983.

*92. BROWN, S.T. and WIESNER, P.J. Problems and approaches to the control and surveillance of sexually transmitted agents associated with pelvic inflammatory disease in the United States. American Journal of Obstetrics and Gynecology 138(7, Pt. 2): 1096-1100. December 1, 1980.

93. BRUCE, L.G. The incidence of genito-urinary tuberculosis in the western region of Scotland. British Journal of Urology 42: 637-641. 1970.

94. BRUCE-CHWATT, L.J. Malaria in African infants and children in southern Nigeria. Annals of Tropical Medicine and Parasitology 46(2): 173-200. September 1952.

95. BUEDING, E. [Johns Hopkins School of Hygiene and Public Health] [Schistosomiasis and infertility] Personal communication, October 18, 1982.

96. BULLOUGH, C.H.W. Infertility and bilharziasis of the female genital tract. British Journal of Obstetrics and Gynaecology 83(10): 819-822. October 1976.

97. BURGOS, A.A. Estudio sobre 100 histórias clínicas de infertilidad. [Study of 100 clinical histories of infertility.] Revista Colombiana de Obstetricia y Ginecología 31(4): 235-242. [1981].

98. BURKMAN, R.T. Intrauterine device use and the risk of pelvic inflammatory disease. American Journal of Obstetrics and Gynecology 138(7, Pt. 2): 861-863. December 1, 1980.

99. BURNEY, P. Some aspects of sexually transmitted disease in Swaziland. British Journal of Venereal Diseases 52(6): 412-414. December 1976.

100. CAFFREY, K.T. Maternal mortality: a continuing challenge in tropical practice: a report from Kaduna, northern Nigeria. East African Medical Journal 56(6): 274-277. June 1979.

101. CALDWELL, J.C. Fertility in Africa. In: Eberstadt, N., ed. Fertility decline in the less developed countries. New York, Praeger, 1981. p. 97-118.

102. CAMPBELL, G.R. and ROBERTS-THOMSON, K. Infertility in the highlands. Papua New Guinea Medical Journal 17(4): 347-353. December 1974.

103. CANNON, D.S.H. Malaria and prematurity in the western region of Nigeria. British Medical Journal (5101): 877-878. October 11, 1958.

104. CANNON, S.B., VEAZEY, J.M., Jr., JACKSON, R.S., BURSE, V.W., HAYES, C., STRAUB, W.E., LANDRIGAN, P.J., and LIDDLE, J.A. Epidemic kepone poisoning in chemical workers. American Journal of Epidemiology 107(6): 529-537. June 1978.

105. CARAYON, A., SANKALE, M., ALMEIDA, J. D', and COURBIL, J.-L. 112 manifestations pathologiques attribueés à la filariose lymphatique. [Pathology of 112 cases attributed to lymphatic filariasis.] [FRE] Bulletin de la Société Médicale d'Afrique Noire de Langue Française 11(3): 634-643. 1966.

106. CARNEY, F.E., Jr. and TAYLOR-ROBINSON, D. Growth and effect of *Neisseria gonorrhoeae* in organ cultures. British Journal of Venereal Diseases 49(5): 435-440. October 1973.

107. CARRUTHERS, G.B. Present-day management of male infertility. IPPF Medical Bulletin 16(3): 1-2. June 1982.

108. CARTY, M.J., NZIOKI, J.M., and VERHAGEN, A.R. The role of gonococcus in acute pelvic inflammatory disease in Nairobi. East African Medical Journal 49(5): 376-379. May 1972.

109. CATES, W., Jr., WEISNER, P.J., and CURRAN, J.W. Sex and spermicides: preventing unintended pregnancy and infection. [Editorial] Journal of the American Medical Association 248(13): 1636-1637. October 1, 1982.

110. CATES, W., Jr., WEISNER, P.J., and GOODRICH, J.T. How to treat PID. Contraceptive Technology Update 3(8): 102-103. August 1982.

111. CAVANAGH, D. and COMAS, M.R. Abortion. In: Danforth, D.N., ed. Textbook of obstetrics and gynecology. New York, Harper & Row, 1971. p. 335-356.

112. CENTERS FOR DISEASE CONTROL. Global distribution of penicillinase-producing *Neisseria gonorrhoeae* (PPNG). Morbidity and Mortality Weekly Report 31(1-2): 1-3. January 22, 1982.

113. CENTERS FOR DISEASE CONTROL. Nonreported sexually transmissible diseases: United States. Morbidity and Mortality Weekly Report 28(6): 61-63. February 16, 1979.

114. CENTERS FOR DISEASE CONTROL. Pelvic inflammatory disease: United States. Morbidity and Mortality Weekly Report 28(51): 605-607. January 4, 1980.

115. CENTERS FOR DISEASE CONTROL. Sexually transmitted diseases treatment guidelines 1982. Morbidity and Mortality Weekly Report 31(2, Suppl.): 33S-60S. August 20, 1982.

116. CHARBONNEAU, H. Les régimes de fécondité naturelle en Amérique du Nord: bilan et analyse des observations. [Natural fertility regimes in North America: analysis of existing observations.] [FRE, summary in ENG] In: Leridon, H. and Menken, J., eds. Natural fertility. Fécondité naturelle. Liège, Belgium, Ordina Editions, 1979. p. 443-491.

117. CHATFIELD, W.R., SUTER, P.E.N., BREMNER, A.D., EDWARDS, E., and MCADAM, J.H. The investigation and management of infertility in East Africa: a prospective study of 200 cases. East African Medical Journal 47(4): 212-216. April 1970.

118. CHEEVER, A.W., KAMEL, I.A., ELWI, A.M., MOSIMANN, J.E., and DANNER, R. *Schistosoma mansoni* and *S. haematobium* infections in Egypt: 2. Quantitative parasitological findings at necropsy. American Journal of Tropical Medicine and Hygiene 26(4): 702-716. July 1977.

119. CHEEVER, A.W., KAMEL, I.A., ELWI, A.M., MOSIMANN, J.E., DANNER, R., and SIPPEL, J.E. *Schistosoma mansoni* and *S. haematobium* infections in Egypt: 3. Extrahepatic pathology. American Journal of Tropical Medicine and Hygiene 27(1): 55-75. January 1978.

120. CHINNATAMBY, S. Infertility services in a family planning clinic. IPPF Medical Bulletin 4(2): 3-4. 1970.

121. CHOWDHURY, A.K.M.A., HUFFMAN, S.L., and CURLIN, G.T. Malnutrition, menarche, and marriage in rural Bangladesh. Social Biology 24(4): 316-325. Winter 1977.

*122. CHOWDHURY, T.A., KHANAM, S.T., AKHTER, M., and HABIB, F. Profile of 350 couples attending the infertility clinic at P.G. Hospital. In: Bangladesh Fertility Research Programme. Fifth Contributors Conference, Dacca, December 13, 1980. Dacca, Bangladesh Fertility Research Programme, [1981]. p. 85-92.

123. CHRISTENSEN, W.I. Genitourinary tuberculosis: review of 102 cases. Medicine 53(5): 377-390. September 1974.

124. CHUKUDEBELU, W.O. Acute pelvic infection (P.I.D.). West African Medical Journal 23(2): 70-75. April 1975.

125. CHUKUDEBELU, W.O. The role of the Nigerian male in infertility. In: Adadevoh, B.K., ed. Sub-fertility and infertility in Africa. Ibadan, Nigeria, Caxton Press, 1974. p. 85-87.

*126. CHUKUDEBELU, W.O., ESEGE, N., and MEGAFU, U. Etiological factors in infertility in Enugu, Nigeria. Infertility 2(2): 193-200. 1979.

127. COLE, C.H., LACHER, T.G., BAILEY, J.C., and FAIRCLOUGH, D.L. Vaginal chemoprophylaxis in the reduction of reinfection in women with gonorrhoea: clinical evaluation of the effectiveness of a vaginal contraceptive. British Journal of Venereal Diseases 56(5): 314-318. October 1980.

128. COLEMAN, S., PIOTROW, P.T., and RINEHART, W. Tobacco : hazards to health and human reproduction. Population Reports, Series L, No. 1. Baltimore, Johns Hopkins University, Population Information Program, March 1979. 40 p.

129. COLLINS, J. Treatment-independent pregnancy among infertile couples. [Abstract] Presented at the annual meeting of the Society of Obstetricians and Gynecologists of Canada, Toronto, June 1982. 1 p.

130. COLLINS, W.P. Ovulation prediction and detection. IPPF Medical Bulletin 16(5): 1-2. October 1982.

131. COOPERMAN, N.R. and RUIZ, G. Clinical aspects of acute pelvic inflammatory disease: Cook County Hospital. American Journal of Obstetrics and Gynecology 138(7, Pt. 2): 1026-1027. December 1, 1980.

132. COURAY, J., CODJIA, A., and CARAYON, A. Contribution à l'étude radio-clinique des stérilités féminines: étude statistique de 168 observations. [Contribution to the radiologic-clinical study of female sterility: statistical study of 168 observations.] [FRE] Bulletin de la Société Medicale d'Afrique Noire de Langue Française 13(4): 805-817. 1968.

133. CRAFT, I., DJAHANBAKHCH, O., MCLEOD, F., BERNARD, A., GREEN, S., TWIGG, H., SMITH, W., LINDSAY, K., and EDMONDS, K. Human pregnancy following oocyte and sperm transfer to the uterus. Lancet 1(8280): 1031-1033. May 8, 1982.

134. CUNNINGHAM, F.G., HAUTH, J.C., GILSTRAP, L.C., HERBERT, W.N.P., and KAPPUS, S.S. The bacterial pathogenesis of acute pelvic inflammatory disease. Obstetrics and Gynecology 52(2): 161-164. August 1978.

135. CURRAN, J.W. Economic consequences of pelvic inflammatory disease in the United States. American Journal of Obstetrics and Gynecology 138(7, Pt. 2): 848-851. December 1, 1980.

136. CURRAN, J.W. Management of gonococcal pelvic inflammatory disease. Sexually Transmitted Diseases 6(2, Suppl.): 174-180. April-June 1979.

137. CUTLER, J.C. Venereal disease prevention. Cutis 27(3): 321-323, 326-327. March 1981.

*138. CUTLER, J.C., SINGH, B., CARPENTER, U., NICKENS, O., SCAROLA, A., SUSSMAN, N., WADE, M., VOLKIN, L., MARSICO, A., and BALISKY, H. Vaginal contraceptives as prophylaxis against gonorrhea and other sexually transmissible diseases. Advances in Planned Parenthood 12(1): 45-56. 1977.

139. D'ANGELO, L.J. and SOKOL, R.J. Time-related peripartum determinants of postpartum morbidity. Obstetrics and Gynecology 55(3): 319-323. March 1980.

140. DANIS, R.P., NEWTON, N., and KEITH, L. Pregnancy and alcohol. Current Problems in Obstetrics and Gynecology 4(6): 2-48. February 1981.

141. DANKOUSSOU, I., DIARRA, S., LAYA, D., and POOL, D.I. Niger. In: Caldwell, J.C., ed. Population growth and socioeconomic change in west Africa. New York, Columbia University Press, 1975. p. 670-693.

142. DAVAJAN, V. Cervical factor. In: Givens, J.R., Andersen, R.N., Cohen, B.M., and Wentz, A.C., eds. The infertile female. Chicago, Year Book Medical Publishers, 1978. p. 377-384.

*143. DAVID N. and VOAS, D. Societal causes of infertility and population decline among the settled Fulani of north Cameroon. Man 16(4): 644-664. December 1981.

144. DE CHERNEY, A.H. and BERKOWITZ, G.S. Female fecundity and age. [Editorial] New England Journal of Medicine 306(7): 424-426. February 18, 1982.

145. DE CHERNEY, A.H., KORT, H., BARNEY, J.B., and DEVORE, G.R. Increased pregnancy rate with oil-soluble hysterosalpingography dye. Fertility and Sterility 33(4): 407-410. April 1980.

146. DECKER, W.H. and LOPEZ, H. Conservative surgical treatment of endometriosis and infertility. Infertility 2(2): 155-164. 1979.

147. DENBER, H.C.B. Psychiatric aspects of infertility. Journal of Reproductive Medicine 20(1): 23-29. January 1978.

148. DIAMOND, M.P., CHRISTIANSON, C., DANIELL, J.F., and WENTZ, A.C. Pregnancy following use of the cervical cup for home artificial insemination utilizing homologous semen. Fertility and Sterility 39(4): 480-484. April 1983.

149. DIXON, R.E., BUTTRAM, V.C., Jr., and SCHUM, C.W. Artificial insemination using homologous semen: a review of 158 cases. Fertility and Sterility 27(6): 647-653. June 1976.

*150. DOR, J., HOMBURG, R., and RABAU, E. An evaluation of etiologic factors and therapy in 665 infertile couples. Fertility and Sterility 28(7): 718-722. July 1977.

151. DRIFE, J.O. Drugs and sperm. British Medical Journal 284(6319): 844-845. March 20, 1982.

152. DUBIN, L. and AMELAR, R.D. Epididymovasostomy. In: Garcia, C.-R., Mastroianni, L., Jr., Amelar, R.D., and Dubin, L., eds. Current therapy of infertility: 1982-1983. Trenton, New Jersey, B.C. Decker, 1982. p. 77-79.

153. DUBIN, L. and AMELAR, R.D. Etiologic factors in 1294 consecutive cases of male infertility. Fertility and Sterility 22(8): 469-474. August 1971.

*154. DUBIN, L. and AMELAR, R.D. A plea for a more scientific approach in the treatment of male infertility. Fertility and Sterility 34(1): 74-75. July 1980.

155. DUBIN, L. and AMELAR, R.D. Varicocelectomy: 986 cases in a 12-year study. Urology 10(5): 446-449. November 1977.

156. DUNCAN, M.E., PERINE, P.L., KRAUSE, D.W., AWOKE, S., and ZAIDI, A.A. Pelvic inflammatory disease and puerperal sepsis in Ethiopia: 2. Treatment. American Journal of Obstetrics and Gynecology 138(7, Pt. 2): 1059-1063. December 1, 1980.

157. DURGAMBA, K.K., SWAMY, S.R., and RAO, C.M. Genital tuberculosis. Indian Journal of Chest Diseases 14(1): 32-37. January 1972.

158. EDINGTON, G.M., NWABUEBO, I., and JUNAID, T.A. The pathology of schistosomiasis in Ibadan, Nigeria with special reference to the appendix, brain, pancreas and genital organs. Transactions of the Royal Society of Tropical Medicine and Hygiene 69(1): 153-162. 1975.

159. EDMONDS, D.K., LINDSAY, K.S., MILLER, J.F., WILLIAMSON, E., and WOOD, P.J. Early embryonic mortality in women. Fertility and Sterility 38(4): 447-453. October 1982.

*160. ESCHENBACH, D.A. Epidemiology and diagnosis of acute pelvic inflammatory disease. Obstetrics and Gynecology 55(5, Suppl.): 142S-153S. May 1980.

161. ESCHENBACH, D.A., BUCHANAN, T.M., POLLOCK, H.M., FORSYTH, P.S., ALEXANDER, E.R., LIN, J.-S., WANG, S.-P., WENTWORTH, B.B., MCCORMACK, W.M., and HOLMES, K.K. Polymicrobial etiology of acute pelvic inflammatory disease. New England Journal of Medicine 293(4): 166-171. July 24, 1975.

162. ESCHENBACH, D.A., HARNISCH, J.P., and HOLMES, K.K. Pathogenesis of acute pelvic inflammatory disease: role of contraception and other risk factors. American Journal of Obstetrics and Gynecology 128(8): 838-850. August 15, 1977.

163. EVANS, H.J., FLETCHER, J., TORRANCE, M., and HARGREAVE, T.B. Sperm abnormalities and cigarette smoking. Lancet 1(8221): 627-629. March 21, 1981.

164. FAGUER, C. and FAI, R. Endometriose et stérilité. [Endometriosis and infertility.] [FRE, summary in ENG] Contraception-Fertilité-Sexualité 7(5): 357-361. May 1979.

165. FALK, V., LUDVIKSSON, K., and AGREN, G. Genital tuberculosis in women. American Journal of Obstetrics and Gynecology 138(7, Pt. 2): 974-977. December 1, 1980.

166. FAYE, A.J. Epidemiological aspects of gonococcal infections in Dakar. [Abstract] British Journal of Venereal Diseases 47(5): 378. October 1971.

*167. FEDERATION DES CENTRES D'ETUDE ET DE CONSERVATION DU SPERME HUMAIN (CECOS), SCHWARTZ, D., and MAYAUX, M.J. Female fecundity as a function of age. New England Journal of Medicine 306(7): 404-406. February 18, 1982.

168. FELDSCHUH, J. and FELDSCHUH, R. Frozen semen and artificial insemination. In: Garcia, C.-R., Mastroianni, L., Jr., Amelar, R.D., and Dubin, L., eds. Current therapy of infertility: 1982-1983. Trenton, New Jersey, B.C. Decker, 1982. p. 64-66.

169. FOSTER G. [Johns Hopkins University School of Medicine] [*In vitro* fertilization: service delivery aspects] Personal communication, February 25, 1983.

*170. FRANK, O. Infertility in sub-Saharan Africa: estimates and implications. Population and Development Review 9(1): 137-144. March 1983.

171. FRAZER, G.B. Bromocriptine in the treatment of female infertility and menstrual irregularities. Journal of the Sierra Leone Medical and Dental Association, [1981]. p. 37-40.

172. FRENCH, F.E. and BIERMAN, J.R. Probabilities of fetal mortality. Public Health Reports 77(10): 835-847. October 1962.

173. FRIBERG, J. Mycoplasmas and ureaplasmas in infertility and abortion. Fertility and Sterility 33(4): 351-359. April 1980.

174. FRIBERG, J. and GNARPE, H. Mycoplasma and human reproductive failure: 3. Pregnancies in "infertile" couples treated with doxycycline for T-mycoplasmas. American Journal of Obstetrics and Gynecology 116(1): 23-26. May 1, 1973.

175. FRIBERG, J. and GNARPE, H. Mycoplasmas in semen from fertile and infertile men. Andrologia 6(1): 45-52. 1974.

176. FRIES, H., NILLIUS, S.J., and PETTERSSON, F. Epidemiology of secondary amenorrhea: 2. A retrospective evaluation of etiology with special regard to psychogenic factors and weight loss. American Journal of Obstetrics and Gynecology 118(4): 473-479. February 15, 1974.

177. FROST, O. Bilharzia of the fallopian tube. South African Medical Journal 49(30): 1201-1203. July 16, 1975.

178. FURUHJELM, M., RYDNER, T., and CARLSTRÖM, K. Hyperprolactinemia in cases of infertility and amenorrhea. Acta Obstetricia et Gynecologica Scandinavica 59(2): 137-141. 1980.

*179. GARCIA, C.-R., MASTROIANNI, L., Jr., AMELAR, R.D., and DUBIN, L., eds. Current therapy of infertility: 1982-1983. Trenton, New Jersey, B.C. Decker, 1982. 25[illegible] p.

180. GARCIA, J., JONES, G.S., and WENTZ, A.C. The use of clomiphene citrate. Fertility and Sterility 28(7): 707-717. July 1977.

181. GARCIA MARTINEZ, A., SALDANA GARCIA, R.H., RINCON CASTANEDA, R., ONDARZA CISNEROS, G., and GONZALEZ BRIONES, M. Analisis general de 500 parejas con esterilidad o infertilidad. [General analysis of 500 couples with sterility or infertility.] [SPA, summary in ENG] Ginecología y Obstetricia de México 41(247): 409-416. May 1977.

182. GARGOUCHA, E., RYJIK, V., and MAXIMOV, G. Certaines causes de stérilité féminine dans la région du Kef (Tunisie). [Certain causes of female sterility in the Kef region of Tunisia.] [FRE] Tunisie Médicale 54(6): 833-836. November-December 1976.

183. GEIGER, H.J. Putting China's medicine in perspective: 1. Health care for a fifth of the world. Medical World News 14(20): 43-49. May 18, 1973.

184. GELFAND, M. The effects of bilharziasis in Rhodesia. Central African Journal of Medicine 19: 1-11. 1973.

185. GELFAND, M., ROSS, C.M.D., BLAIR, D.M., CASTLE, W.M., and WEBER, M.C. Schistosomiasis of the male pelvic organs. American Journal of Tropical Medicine and Hygiene 19(5): 779-784. September 1970.

186. GELFAND, M., ROSS, M.D., BLAIR, D.M., and WEBER, M.C. Distribution and extent of schistosomiasis in female

pelvic organs, with special reference to the genital tract, as determined at autopsy. American Journal of Tropical Medicine and Hygiene 20(6): 846-849. November 1971.

187. GETZOFF, P.L. Psychotropic drug induced male infertility: a case report. Infertility 1(1): 53-58. 1978.

188. GILSTRAP, L.C., 3rd, HERBERT, W.N.P., CUNNINGHAM, F.G., HAUTH, J.C., and VAN PATTEN, H.G. Gonorrhea screening in male consorts of women with pelvic infections. Journal of the American Medical Association 238(9): 965-966. August 29, 1977.

189. GINER, J., MERINO, G., LUNA, J., and AZNAR, R. Evaluation of the Sims-Huhner postcoital test in fertile couples. Fertility and Sterility 25(2): 145-148. February 1974.

190. GINSBURG, D.S., STERN, J.L., HAMOD, K.A., GENADRY, R., and SPENCE, M.R. Tubo-ovarian abscess: a retrospective review. American Journal of Obstetrics and Gynecology 138(7, Pt. 2): 1055-1058. December 1, 1980.

191. GIORGINO, F.L. and MEGA, M. Toxoplasmosis and habitual abortion. Clinical and Experimental Obstetrics and Gynecology 8(3): 132-134. 1981.

192. GITHIARI, J.N. Pattern of the infertility problem at Kenyatta National Hospital. M. Med. thesis, University of Nairobi, 1979. 19 p. (Unpublished)

193. GIVENS, J.R., ed. The infertile female. Chicago, Year Book Medical Publishers, 1978. 545 p.

194. GNARPE, H. and FRIBERG, J. Mycoplasma and human reproductive failure: 1. The occurrence of different mycoplasmas in couples with reproductive failure. American Journal of Obstetrics and Gynecology 114(6): 727-731. November 15, 1972.

195. GNARPE, H. and FRIBERG, J. T mycoplasmas on spermatozoa and infertility. Nature 245(5420): 97-98. September 14, 1973.

196. GOMEL, V. Salpingostomy by microsurgery. Fertility and Sterility 29(4): 380-387. April 1978.

197. GONZALEZ, R.R. [Colegio Mayor del Rosario] [Infertility in Colombia] Personal communication, 1983. 2 p.

198. GOPALAN, C. and NAIDU, A.N. Nutrition and fertility. Lancet 2(7786): 1077-1079. November 18, 1972.

199. GOW, J.G. Genito-urinary tuberculosis. Practitioner 207(1241): 609-616. November 1971.

200. GRABSTALD, H. and SWAN, L.L. Genitourinary lesions in leprosy with special reference to the problem of atrophy of the testes. Journal of the American Medical Association 149(13): 1287-1291. July 26, 1952.

*201. GRAY, R.H. Biological factors other than nutrition and lactation which may influence natural fertility: a review. [ENG, summary in FRE] In: Leridon, H. and Menken, J., eds. Natural fertility. Fécondité naturelle. Liège, Belgium, Ordina Editions, 1979. p. 219-251.

202. GRAY, R.H. Epidemiological problems in the evaluation of male fertility. [ENG, summary in FRE] In: Spira, A. and Jouannet, P., eds. Les facteurs de la fertilité humaine (avec référence particulière au sexe masculin). Human fertility factors (with emphasis on the male). Paris, Institut National de la Santé et de la Recherche Médicale (INSERM), 1982. p. 31-42.

203. GRAY, R.H. [Johns Hopkins University] [WHO case-control study on pelvic inflammatory disease] Personal communication, February 23, 1983.

*204. GRECH, E.S., EVERETT, J.V., and MUKASA, F. Epidemiological aspects of acute pelvic inflammatory disease in Uganda. Tropical Doctor 3(3): 123-127. July 1973.

205. GRECH, E.S., GALEA, J., and TRUSSELL, R.R. Maternal mortality in Uganda. International Journal of Gynaecology and Obstetrics 7(6): 263-278. December 1969.

206. GREENBERG, S.H. Varicocele and male fertility. In: Wallach, E.E. and Kempers, R.D., eds. Modern trends in infertility and conception control. Vol. 1. Baltimore, Williams & Wilkins, 1979. p. 302-309.

207. GRIFFITH, H.B. Gonorrhoea and fertility in Uganda. Eugenics Review 55(2): 103-108. July 1963.

208. GROVE, D.I., VALEZA, F.S., and CABRERA, B.D. Bancroftian filariasis in a Philippine village: clinical, parasitological, immunological, and social aspects. Bulletin of the World Health Organization 56(6): 975-984. 1978.

209. GUEST, .. Infertility in Africa. People (Special Report): 1-12. [1978].

210. GUMP, D.W., GIBSON, M., and ASHIKAGA, T. Infertile women and *Chlamydia trachomatis* infection. In: Mårdh, P.-A., Holmes, K.K., Oriel, J.D., Piot, P., and Schachter, J., eds. Chlamydial infections. New York, Elsevier Biomedical Press, 1982. p. 193-196.

211. GUMP, D.W., GIBSON, M., and ASHIKAGA, T. Evidence of prior pelvic inflammatory disease and its relationship to *Chlamydia trachomatis* antibody and intrauterine contraceptive device use in infertile women. American Journal of Obstetrics and Gynecology 116(2): 153-159. May 15, 1983.

212. HAFEZ, E.S.E. The cervix in relation to fertility and infertility. Journal of Reproductive Medicine 3(2): 25-27. September 1969.

213. HAKIM, S. EL. Sudan: replacing TBAs by village midwives. In: Mangay-Maglacas, A. and Pizurki, H., eds. The traditional birth attendant in seven countries: case studies in utilization and training. Geneva, World Health Organization, 1981. p. 131-166.

214. HALIM, A. Investigation and treatment of the infertile male. Proceedings of the Royal Society of Medicine 66: 373-378. April 1973.

215. HALLIDAY, H.L., REID, M.M., and MCCLURE, G. Results of heavy drinking in pregnancy. British Journal of Obstetrics and Gynaecology 89: 892-895. November 1982.

216. HANDSFIELD, H.H. Nongonococcal urethritis. Cutis 27(3): 268-277. March 1981.

217. HARLAP, S. and SHIONO, P.H. Alcohol, smoking, and incidence of spontaneous abortions in the first and second trimester. Lancet 2(8187): 173-176. July 26, 1980.

218. HARRISON, R.F., LOUVOIS, J. DE., BLADES, M., and HURLEY, R. Doxycycline treatment and human infertility. Lancet 1(7907): 605-607. March 15, 1975.

219. HARWICK, H.J., PURCELL, R.H., IUPPA, J.B., and FEKETY, F.R., Jr. *Mycoplasma hominis* and postpartum febrile complications. Obstetrics and Gynecology 37(5): 765-768. May 1971.

220. HATCHER, R.A. Intercourse: the hidden contraceptive. Contraceptive Technology Update 1(5): 70-71. August 1980.

221. HATCHER, R.A., STEWART, G.K., STEWART, F., GUEST, F., JOSEPHS, N., and DALE, J. Contraceptive technology: 1982-1983. (11th rev. ed.) New York, Irvington, 1982. 266 p.

222. HELLMAN, L.M. and PRITCHARD, J.A. Puerperal infection. In: Williams obstetrics. 14th ed. New York, Appleton-Century-Crofts, 1971. p. 971-992.

223. HEMMINKI, K., MUTANEN, P., and SALONIEMI, I. Smoking and the occurrence of congenital malformations and spontaneous abortions: multivariate analysis. American Journal of Obstetrics and Gynecology 145(1): 61-64. January 1, 1983.

224. HENDERSHOT, G.E., MOSHER, W.D., and PRATT, W.F. Infertility and age: an unresolved issue. Family Planning Perspectives 14(5): 287-289. September-October 1982.

225. HENDERSON, R.H. Control of sexually transmitted diseases in the United States: a federal perspective. British Journal of Venereal Diseases 53(4): 211-215. August 1977.

*226. HENIN, R.A. Fertility, infertility and sub-fertility in eastern Africa. [ENG, summary in FRE] In: International population conference. Conference international de la population. Vol. 3. (Papers of the 19th General Conference of the International Union for the Scientific Study of Population) Liège, Belgium, Ordina Editions, [1981]. p. 667-697.

227. HERITAGE, D.W., ENGLISH, S.C., YOUNG, R.B., and CHEN, A.T.L. Cytogenetics of recurrent abortions. Fertility and Sterility 29(4): 414-417. April 1978.

228. HERTIG, A.T. and ROCK, J. Searching for early fertilized human ova. Gynecologic Investigation 4: 121-139. 1973.

229. HEUMAN, L. and PORTA, C.A. Diagnostico laparoscopico de la enfermedad inflamatoria pélvica como factor de esterilidad. [Laparoscopic diagnosis of pelvic inflammatory disease as a factor in sterility.] [SPA] 1982. 5 p. (Unpublished)

230. HINGORANI, V., PRAKASH, O., CHOWDHRY, P., and KAMALAM, T.S. Toxoplasmosis: abortions and stillbirths. Indian Journal of Medical Research 58(7): 967-974. July 1970.

231. HIRA, S.K., BHAT, C.J., RATNAM, A.V., CHINTU, C., and MULENGA, R.C. Congenital syphilis in Lusaka: 2. Incidence at birth and potential risk among hospital deliveries. East African Medical Journal 59(5): 306-310. May 1982.

232. HIRA, S.K., RATNAM, A.V., SEHGAL, D., BHAT, G.J., CHINTU, C., and LULENGA, R.C. Congential syphilis in Lusaka: 1. Incidence in general nursery ward. East African Medical Journal 59(4): 241-246. April 1982.

233. HOCHEGGER, H. Les relations époux-épouse chez les Buma (République du Zaïre). [Conjugal relations among the Buma (Zaire).] [FRE, summary in ENG] In: Oppong, C., Adaba, G., Bekombo-Priso, M., and Mogey, J., eds. Marriage, fertility and parenthood in west Africa. Canberra, Australian National University, 1978. (Changing African Family Project Monograph Series No. 4, Pt. 2) p. 805-826.

234. HOLCK, S.E. and CATES, W., Jr. Fertility and population dynamics in two Kampuchean refugee camps. Studies in Family Planning 13(4): 118-124. April 1982.

235. HOLMES, K.K. Sexually transmitted diseases: past, present and future. Presented at Epidemic Intelligence Service Conference, Centers for Disease Control, Atlanta, Georgia, April 20, 1983.

*236. HOLMES, K.K., ESCHENBACH, D.A., and KNAPP, J.S. Salpingitis: overview of etiology and epidemiology. American Journal of Obstetrics and Gynecology 138(7, Pt. 2): 893-900. December 1, 1980.

*237. HOLMES, K.K. and MÅRDH, P.-A., eds. International perspectives on neglected sexually transmitted diseases. Washington, D.C., Hemisphere Publishing, 1983. 336 p.

238. HOLTZ, G. Prevention of postoperative adhesions. Journal of Reproductive Medicine 24(4): 141-146. April 1980.

239. HONORAT, M. and GRUET, M. Bilan de 4 ans de traitement de la stérilité féminine d'origine tubaire. [Assessment of four years of treatment of female tubal sterility.] [FRE] Bulletin de la Société Médicale d'Afrique Noire de Langue Française 16(3): 320-324. 1971.

240. HOPCRAFT, M., VERHAGEN, A.R., NGIGI, S., and HAGA, A.C.A. Genital infections in developing countries: experience in a family planning clinic. [ENG, summary in FRE] Bulletin of the World Health Organization 48(5): 581-586. 1973.

241. HORAN, A.H. When and why does occlusion of the vas deferens affect the testis. Fertility and Sterility 26(4): 317-328. April 1975.

242. HORN, J.S. The conquest of syphilis. In: Away with all pests: an English surgeon in People's China: 1954-1969. New York, Monthly Review Press, 1969. p. 81-93.

243. HU, C.K., CHEN, C.C., YEH, K.Y., WANG, K.C., CHEN, H.T., and SUN, H.L. The control of venereal diseases in new China. Chinese Medical Journal 71(3): 248-258. July-August 1953.

244. HUGGINS, G.R. Contraceptive use and subsequent fertility. Fertility and Sterility 28(6): 603-612. June 1977.

245. HULL, T.H. and TUKIRAN. Regional variations in the prevalence of childlessness in Indonesia. Indonesian Journal of Geography 6(32): 1-25. December 1976.

246. HUME, J. [Johns Hopkins School of Hygiene and Public Health] [Cross-immunity to treponemes and incidence of syphilis] Personal communication, February 7, 1983.

247. HUNGER, K.F.H. Education at school about sexually transmitted diseases. British Journal of Venereal Diseases 52(2): 100-101. April 1976.

248. HUNTER, C.A., Jr. The puerperium. In: Danforth, D.N., ed. Textbook of obstetrics and gynecology. New York, Harper & Row, 1971. p. 714-725.

249. IDSØE, O., GUTHE, T., WILLCOX, R.R., and DE WECK, A.L. Nature and extent of penicillin side-reactions, with particular reference to fatalities from anaphylactic shock. Bulletin of the World Health Organization 38(2): 159-188. 1968.

250. IDSØE, O., KIRALY, K., and CAUSSE, G. Venereal disease and treponematoses: the epidemiological situation and WHO's control programme. WHO Chronicle 27: 410-417. October 1973.

251. INDIA. STATE FAMILY WELFARE BUREAU. Sub-fertility: an integral component of family welfare programme. Lucknow, State Family Welfare Bureau, January 1, 1979. (Technical Report Series No. 4) 9 p.

252. INGRAHAM, N.R., Jr. The value of penicillin alone in the prevention and treatment of congenital syphilis. Acta Dermato-Venereologica 31(Suppl. 24): 60-88. 1951.

253. INTERNATIONAL PLANNED PARENTHOOD FEDERATION. Family planning in Chile: a profile of the development of policies and programmes. London, IPPF, [1980]. 25 p.

254. JACOBSON, L. Differential diagnosis of acute pelvic inflammatory disease. American Journal of Obstetrics and Gynecology 138(7, Pt. 2): 1006-1011. December 1, 1980.

255. JAFFE, H.W., REYNOLDS, G.H., and WIESNER, P.J. National gonorrhea therapy monitoring study: adverse drug reactions. Journal of the American Venereal Disease Association 3(1): 29-31. September 1976.

256. JANSEN, R.P.S. Spontaneous abortion incidence in the treatment of infertility. American Journal of Obstetrics and Gynecology 143(4): 451-473. June 15, 1982.

257. JARAMILLO A., O., BLUM G., E., and FREER M., E. Costa Rica: programa para el control de las enfermedades de transmisión sexual. [Costa Rica: sexually transmitted diseases control program.] [SPA] Boletín de la Oficina Sanitaria Panamericana 86(2): 131-140. February 1979.

258. JAUREGUIBERRY, A. DE. Maternal obstetric emergencies in rural Africa. Children in the Tropics (92): 3-20. 1974.

259. JICK, H., HANNAN, M.T., STERGACHIS, A., HEIDRICH, F., PERERA, D.R., and ROTHMAN, K.J. Vaginal spermicides and gonorrhea. Journal of the American Medical Association 248(13): 1619-1621. October 1, 1982.

260. JOHNSON, R.E. Epidemiologic and prophylactic treatment of gonorrhea: a decision analysis review. Sexually Transmitted Diseases 6(2, Suppl.): 159-167. April-June 1979.

261. JONES, G.S. and POURMAND, K. An evaluation of etiologic factors and therapy in 555 private patients with primary infertility. Fertility and Sterility 13(5): 398-410. September-October 1962.

262. JONES, H.W., Jr. Reproductive impairment and the malformed uterus. Fertility and Sterility 36(2): 137-148. August 1981.

263. JONES, H.W., Jr. [Eastern Virginia Medical School] [Service delivery aspects of *in vitro* fertilization and embryo transfer] Personal communication, March 2, 1983.

264. JONES, H.W., Jr., ACOSTA, A.A., GARCIA, J.E., SANDOW, B.A., and VEECK, L. On the transfer of conceptuses from oocytes fertilized *in vitro*. Fertility and Sterility 39(2): 241-243. February 1983.

*265. JONES, H.W., Jr., JONES, G.S., ANDREWS, M.C., ACOSTA, A., BUNDREN, C., GARCIA, J., SANDOW, B., VEECK, L., WILKES, C., WITMYER, J., WORTHAM, J.E., and WRIGHT, G. The program for *in vitro* fertilization at Norfolk. Fertility and Sterility 38(1): 14-21. July 1982.

266. JONES, K.L., SMITH, D.W., ULLELAND, C.N., and STREISSGUTH, A.P. Pattern of malformation in offspring of chronic alcoholic mothers. Lancet 2(7815): 1267-1271. June 9, 1973.

267. JONES, O.G., ZAIDI, A.A., and ST. JOHN, R.K. Frequency and distribution of salpingitis and pelvic inflammatory disease in short-stay hospitals in the United States. American Journal of Obstetrics and Gynecology 138(7, Pt. 2): 905-908. December 1, 1980.

268. JONES, R.B., ARDERY, B.R., HUI, S.L., and CLEARY, R.E. Correlation between serum antichlamydial antibodies and tubal factor as a cause of infertility. Fertility and Sterility 38(5): 553-558. November 1982.

269. JONES, W.R. The investigation of immunological infertility. Medical Journal of Australia 2(4): 188-192. August 25, 1979.

270. KALTER, H. and WARKANY, J. Congenital malformations (Pt. 1). New England Journal of Medicine 308(8): 424-431. February 24, 1983.

271. KALTER, H. and WARKANY, J. Congenital malformations (Pt. 2). New England Journal of Medicine 308(9): 491-497. March 3, 1983.

272. KAMAT, M. Diet and fecundity in India. In: International Planned Parenthood Federation [IPPF]. The sixth international conference on planned parenthood. London, IPPF, [1959]. p. 114-121.

273. KANG-WANG, J.F. The midwife in Taiwan: an alternative model for maternity care. Human Organization 39(1): 70-79. Spring 1980.

*274. KATAYAMA, K.P. Advances in infertility. In: Wynn, R.M., ed. Obstetrics and gynecology annual, Vol. 9. New York, Appleton-Century-Crofts, 1980. p. 281-310.

*275. KATAYAMA, K.P., JU, K.-S., MANUEL, M., JONES, G.S., and JONES, H.W., Jr. Computer analysis of etiology and pregnancy rate in 636 cases of primary infertility. American Journal of Obstetrics and Gynecology 135(2): 207-214. September 15, 1979.

276. KAUFMAN, D.W., SHAPIRO, S., ROSENBERG, L., MONSON, R.R., MIETTINEN, O.S., STOLLEY, P.D., and SLONE, D. Intrauterine contraceptive device use and pelvic inflammatory disease. American Journal of Obstetrics and Gynecology 136 (2): 159-162. Jaunary 15, 1980.

277. KAUR, T. and DEBDAS, A.K. Laparotomy for female infertility. Journal of the Indian Medical Association 74(9): 165-168. May 1, 1980.

278. KEITH, L., BERGER, G.S., and MOSS, W. Cervical gonorrhea in women using different methods of contraception. Journal of the American Venereal Disease Association 3(1): 17-19. September 1976.

*279. KELAGHAN, J., RUBIN, G.L., ORY, H.W, and LAYDE, P.M. Barrier-method contraceptives and pelvic inflammatory disease. Journal of the American Medical Association 248(2): 184-187. July 9, 1982.

280. KEYE, W.R., Jr. Strategy for avoiding iatrogenic infertility. Contemporary Ob/Gyn 19(3): 185-195. March 1982.

281. KEYS, A., BROŽEK, J., HENSCHEL, A., MICKELSEN, O., TAYLOR, H.L., SIMONSON, E., SKINNER, A.S., and WELLS, S.M. Sexual function. In: The biology of human starvation. (Vol. 1). Minneapolis, University of Minnesota Press, 1950. p. 749-763.

282. KIBUKAMUSOKE, J.W. Venereal disease in East Africa. Transactions of the Royal Society of Tropical Medicine and Hygiene 59(6): 642-648. November 1965.

283. KIMBALL, A.C., KEAN, B.H., and FUCHS, F. The role of toxoplasmosis in abortion. American Journal of Obstetrics and Gynecology 111(2): 219-226. September 15, 1971.

284. KING, T.M. and BURKMAN, R.T. Pelvic inflammatory disease. In: Alvarez, R.R. de, ed. Textbook of gynecology. Philadelphia, Lea & Febiger, 1977. p. 413-429.

285. KISTNER, R.W. Management of endometriosis in the infertile patient. Fertility and Sterility 26(12): 1151-1166. December 1975.

286. KLEIN, T.A., RICHMOND, J.A., and MISHELL, D.R., Jr. Pelvic tuberculosis. Journal of Obstetrics and Gynecology 48(1): 99-104. July 1976.

*287. KLEINMAN, R.L. and SENANAYAKE, P., eds. Handbook on infertility. London, International Planned Parenthood Federation, 1979. 58 p.

288. KLINE, J., LEVIN, B., STEIN, Z., SUSSER, M., and WARBURTON, D. Epidemiologic detection of low dose effects on the developing fetus. Environmental Health Perspectives 42: 119-126. December 1981.

289. KLINE, J., SHROUT, P., STEIN, Z., SUSSER, M., and WARBURTON, D. Drinking during pregnancy and spontaneous abortion. Lancet 2(8187): 176-180. July 26, 1980.

290. KOCHAR, M. Etiology of pelvic infections treated by the gynecologic service of the Kasturba Hospital, Delhi, India. American Journal of Obstetrics and Gynecology 138(7, Pt. 2): 872-874. December 1, 1980.

291. KOLATA, G.B. Infertility: promising new treatments. Science 202(4364): 200-203. October 13, 1978.

292. KOLS, A., RINEHART, W., PIOTROW, P.T., DOUCETTE, L., and QUILLIN, W.F. Oral contraceptives in the 1980s. Population Reports, Series A, No. 6. Baltimore, Johns Hopkins University, Population Information Program, May-June 1982. 36 p.

*293. KRAMER, D.G. and BROWN S.T. Sexually transmitted diseases and infertility. [1982]. 22 p. (Unpublished)

294. KREDENTSER, J.V., HOSKINS, C.F., and SCOTT, J.Z. Hyperprolactinemia — a significant factor in female infertility. American Journal of Obstetrics and Gynecology 139(3): 264-267. February 1, 1981.

295. KRETSER, D.M. DE. Endocrinology of male infertility. British Medical Bulletin 35(2): 187-192. May 1979.

296. KRISHNA, U.R., SATHE, A.V., MEHTA, H., WAGLE, S., and PURANDARE, V.N. Tubal factors in sterility: a laparoscopic study of 697 cases of sterility. Journal of Obstetrics and Gynaecology of India 29(3): 663-667. June 1979.

297. KRISHNA, U.R., SHETH, S.S., and MOTASHAW, N.G. Place of laparoscopy in pelvic inflammatory disease. Journal of Obstetrics and Gynaecology of India 29(3): 505-510. June 1979.

298. KROGER, F. and WIESNER, P.J. STD education: challenge for the 80s. Journal of School Health 51(4): 242-246. April 1981.

*299. LADIPO, O.A. An evaluation of 576 hysterosalpingograms on infertile women. Infertility 2(1): 63-70. 1979.

300. LADIPO, O.A. Experience with clomiphene and bromocryptine in the treatment of infertility. Journal of the National Medical Association 72(4): 339-342. 1980.

301. LADIPO, O.A. [University College Hospital, Ibadan] [Infertility in Nigeria] Personal communication, October 27, 1982.

302. LADIPO, O.A. The role of artificial insemination in the management of infertility. East African Medical Journal 56(5): 219-222. May 1979.

303. LADIPO, O.A. Seminal analysis in fertile and infertile Nigerian men. Journal of the National Medical Association 72(8): 785-789. 1980.

304. LADIPO, O.A. Tests of tubal patency: comparison of laparoscopy and hysterosalpingography. British Medical Journal 2(6047): 1297-1298. November 27, 1976.

305. LADIPO, O.A. and OSOBA, A.O. T-mycoplasma and reproductive failure. Infertility 2(2): 135-145. 1979.

306. LADIPO, O.A. and OSOBA, A.O. *Ureaplasma urealyticum* (T. mycoplasma) and male infertility in tropical countries. African Journal of Medicine and Medical Sciences 7(4): 187-190. December 1978.

307. [LALA, B.] Projet inter pays ICP/BVM/002 basé à Bangui: premier bilan/appréciation — perspectives d'avenir. [Intercountry project ICP/BVM/002 based in Bangui: initial evaluation/assessment — future outlook.] [FRE] [1982]. 8 p. (Unpublished)

308. LAMBERT, B. The frequency of mumps orchitis and the consequences for sexuality and fertility. Acta Genetica et Statistica Medica 2(Suppl. 1): 1-166. 1951.

309. LANCRANJAN, I., POSECU, H., and GALVENESCU, O., et al. Reproductive ability of workmen occupationally exposed to lead. Archives of Environmental Health 30: 396-401. 1975.

310. LANGER, H. Repeated congenital infection with *Toxoplasma gondii*. Obstetrics and Gynecology 21(3): 318-329. March 1963.

311. LANGUILLAT, G., ALBERT, M., TURSZ, A., and BLOT, P. Enquête sur l'étiologie de l'hypofécondité au Gabon oriental. 1. Protocole et premiers résultats. [Etiological study of low fertility in eastern Gabon: 1. Scheme and first findings.] [FRE, summary in ENG] Revue d'Epidémiologie et de Santé Publique 26(3): 237-257. 1978.

312. LANGUILLAT, G., GARIN, Y., TURSZ, A., BEAUVAIS, B., and LARIVIERE, M. Enquête sur l'étiologie de l'hypofécondité au Gabon oriental: 3. Endémie filarienne (*Loa loa, D. perstans*). Fréquence des microfilaires dans les hydrocèles. [Etiological study of low fertility in eastern Gabon: 3. Filarial endemicity (*Loa loa, D. perstans*). Prevalence of microfilariae in hydroceles.] [FRE] Revue d'Epidémiologie et de Santé Publique 26(3): 273-282. 1978.

313. LANTUM, D.N. Population dynamics of rural Cameroon and its public health repercussions. Yaounde, Cameroon, Public Health Unit, University Centre for Health Sciences, University of Yaounde, 1979. 314 p.

314. LARSEN, J.V. and MULLER, E.J. Obstetric care in a rural population. South African Medical Journal 54(27): 1137-1140. December 30, 1978.

315. LAUFE, L.E. Infertility and family planning. [1979]. 6 p. (Unpublished)

316. LAURITSEN, J.G. Genetic aspects of spontaneous abortion. Danish Medical Bulletin 24(5): 169-189. October 1977.

317. LAWSON, J.B. Birth-canal injuries. Proceedings of the Royal Society of Medicine 61(4): 22-24. April 1968.

318. LAWSON, J.B. Infections complicating pregnancy. In: Lawson, J.B. and Stewart, D.B., eds. Obstetrics and gynaecology in the tropics and developing countries. London, Edward Arnold, 1967. p. 43-58.

319. LAWSON, J.B. Malaria and pregnancy. In: Lawson, J.B. and Stewart, D.B., eds. Obstetrics and gynaecology in the tropics and developing countries. London, Edward Arnold, 1967. p. 59-72.

320. LAWSON, J.B. Obstructed labour. In: Lawson, J.B. and Stewart, D.B., eds. Obstetrics and gynaecology in the tropics and developing countries. London, Edward Arnold, 1967. p. 172-202.

321. LAWSON, J.B. Sequelae of obstructed labour. In: Lawson, J.B. and Stewart, D.B., eds. Obstetrics and gynaecology in the tropics and developing countries. London, Edward Arnold, 1967. p. 203-218.

*322. LAWSON, J.B. and STEWART, D.B., eds. Obstetrics and gynaecology in the tropics and developing countries. London, Edward Arnold, 1967. 630 p.

323. LEDGER, W.J. Infection. In: Romeny, S.L., Gray, M.J., Little, A.B., Merrill, J.A., Quilligan, E.G., and Stander, R.W., eds. Gynecology and obstetrics: the health care of women. 2nd ed. New York, McGraw-Hill, 1981. p. 227-261.

324. LEDWARD, R.S. Infertility in Saudi Arabia: initial experience in a new gynaecological unit. Tropical Doctor 10(3): 117-119. July 1980.

325. LEE, H.Y. [Studies on male infertility] [KOR] Journal of Korean Medical Association 13: 1008-1017. 1970.

326. LEETON, J., TROUNSON, A., JESSUP, D., and WOOD, C. The technique for human embryo transfer. Fertility and Sterility 38(2): 156-161. August 1982.

*327. LEKE, R.J.I. and NASAH, B.T. Biological and socio-cultural aspects of infertility and subfertility in Africa. In: United Nations Economic Commission for Africa (UNECA). Population dynamics: fertility and mortality in Africa. Addis Ababa, Ethiopia, UNECA, May 1981. (ST/ECA/SER.A/1; UNFPA PROJ. No. RAF/78/P17) p. 488-498.

328. LENTON, E.A., WESTON, G.A., and COOKE, I.D. Long-term follow-up of the apparently normal couple with a complaint of infertility. Fertility and Sterility 28(9): 913-919. September 1977.

329. LERIDON, H. Fécondité, fertilité, stérilité: problèmes de terminologie. [Fertility, fecundity, sterility: problems of terminology.] [FRE, summary in ENG] In: Spira, A. and Jouannet, P., eds. Les facteurs de la fertilité humaine (avec référence particulière au sexe masculin). Human fertility factors (with emphasis on the male). Paris, Institut National de la Santé et de la Recherche Médicale (INSERM), 1982. p. 17-30.

*330. LERIDON, H. and MENKEN, J., eds. Natural fertility. Fécondité naturelle. Liège, Belgium, Ordina Editions, 1979. 556 p.

331. LINN, S., SCHOENBAUM, S.C., MONSON, R.R., ROSNER, B., and RYAN, K.J. Delay in conception for former 'pill' users. Journal of the American Medical Association 247(5): 629-632. February 5, 1982.

332. LISKIN, L.S. Complications of abortion in developing countries. Population Reports, Series F, No. 7. Baltimore, Johns Hopkins University, Population Information Program, July 1980. 50 p.

333. LITTLE, R.E. Epidemiologic and experimental studies in drinking and pregnancy: the state of the art. Neurobehavioral Toxicology and Teratology 3(2): 163-167. Summer 1981.

334. LOMHOLT, G. Venereal problems in a developing country. Tropical Doctor 6(1): 7-10. January 1976.

335. LONGO, L.D. Sociocultural practices relating to obstetrics and gynecology in a community of west Africa. American Journal of Obstetrics and Gynecology 89(4): 470-475. June 15, 1964.

336. LOPATA, A., JOHNSTON, I.W.H., HOULT, I.J., and SPEIRS, A.I. Pregnancy following intrauterine implantation of an embryo obtained by *in vitro* fertilization of a preovulatory egg. Fertility and Sterility 33(2): 117-120. February 1980.

337. LOPATA, A., JOHNSTON, I., and SPEIRS, A. *In vitro* fertilization. In: Garcia, C.-R., Mastroianni, L., Jr., Amelar, R.D., and Dubin, L., eds. Current therapy of infertility: 1982-1983. Trenton, New Jersey, B.C. Decker, 1982. p. 213-216.

338. LOPATA, A., MARTIN, M., OLIVA, K., and JOHNSTON, I. Embryonic development and blastocyst implantation following *in vitro* fertilization and embryo transfer. Fertility and Sterility 38(6): 682-687. December 1982.

339. LORIMER, F. Culture and human fertility. New York, Greenwood Press, 1958. 510 p.

340. LUNDE, M. [US National Institutes of Health] [Toxoplasmosis and recurrent pregnancy wastage] Personal communication, December 3, 1982.

341. LYCKE, E., LÖWHAGEN, G.-B., HALLHAGEN, G., JOHANNISSON, G., and RAMSTEDT, K. The risk of transmission of genital *Chlamydia trachomatis* infection is less than that of genital *Neisseria gonorrhoeae* infection. Sexually Transmitted Diseases 7(1): 6-10. January-March 1980.

342. MABEY, D.C.W. and WHITTLE, H.C. Genital and neonatal chlamydial infection in a trachoma endemic area. Lancet 2(8293): 300-301. August 7, 1982.

343. MACCORMACK, C.P., ed. Ethnography of fertility and birth. London, Academic Press, 1982. 293 p.

344. MACGREGOR, J.D. and AVERY, J.G. Malaria transmission and fetal growth. British Medical Journal 3(5928): 433-436. August 17, 1974.

345. MACHOL, L. Environmental hazards: what they'll mean to your patients in the 1980s. Contemporary Ob/Gyn 15: 22-43. January 1980.

346. MACKEY, R.A., GLASS, R.H., OLSON, L.E., and VAIDYA, R. Pregnancy following hysterosalpingography with oil and water soluble dye. Fertility and Sterility 22(8): 504-507. August 1971.

347. MACLEOD, J. Further observations on the role of varicocele in human male infertility. Fertility and Sterility 20(4): 545-563. July-August 1969.

348. MACLEOD, J. Seminal cytology in the presence of varicocele. Fertility and Sterility 16(6): 735-757. November-December 1965.

349. MACLEOD, J. and GOLD, R.Z. The male factor in fertility and infertility: 2. Spermatozoon counts in 1000 men of known fertility and in 1000 cases of infertile marriage. Journal of Urology 66(3): 436-449. September 1951.

*350. MACLEOD, J. and WANG, Y. Male fertility potential in terms of semen quality: a review of the past, a study of the present. Fertility and Sterility 31(2): 103-116. February 1979.

351. MACPHERSON, T.A. A retrospective study of maternal deaths in the Zimbabwean black. Central African Journal of Medicine 27(4): 57-60. April 1981.

352. MAGDI, I. Bilharziasis (schistosomiasis) of the female genital tract. In: Lawson, J.B. and Stewart, D.B., eds. Obstetrics and gynaecology in the tropics and developing countries. London, Edward Arnold, 1967. p. 416-431.

353. MAHGOUB, S. EL-. Antispermatozoal antibodies in infertile women with cervicovaginal schistosomiasis. American Journal of Obstetrics and Gynecology 112(6): 781-783. March 15, 1972.

354. MAHGOUB, S. EL-. Pelvic schistosomiasis and infertility. International Journal of Gynaecology and Obstetrics 20(3): 201-206. June 1982.

355. MAKOKHA, A.E. Maternal mortality: Kenyatta National Hospital: 1972-1977. East African Medical Journal 57(7): 451-460. July 1980.

356. MANGAY-ANGARA, A. Philippines: the development and use of the national registry of traditional birth attendants. In: Mangay-Maglacas, A. and Pizurki, H., eds. The traditional birth attendant in seven countries: case studies in utilization and training. Geneva, World Health Organization, 1981. p. 37-70.

*357. MANGAY-MAGLACAS, A. and PIZURKI, H., eds. The traditional birth attendant in seven countries: case studies in utilization and training. Geneva, World Health Organization, 1981. (Public Health Papers No. 75) 211 p.

358. MANLEY DE CARIAS, M. and CHANGS, M.I. Honduras: administrative arrangements for linking the TBA with the formal health system. In: Mangay-Maglacas, A. and Pizurki, H., eds. The traditional birth attendant in seven countries: case studies in utilization and training. Geneva, World Health Organization, 1981. p. 27-36.

*359. MÅRDH, P.-A. An overview of infectious agents of salpingitis, their biology, and recent advances in methods of detection. American Journal of Obstetrics and Gynecology 138(7, Pt. 2): 933-951. December 1, 1980.

360. MÅRDH, P.-A., LIND, I., SVENSSON, L., WESTRÖM, L., and MØLLER, B.R. Antibodies to *Chlamydia trachomatis, Mycoplasma hominis*, and *Neisseria gonorrhoeae* in sera from patients with acute salpingitis. British Journal of Venereal Diseases 57(2): 125-129. April 1981.

361. MÅRDH, P.-A., MØLLER, B.R., and PAAVONEN, J. Chlamydial infection of the female genital tract with emphasis on pelvic inflammatory disease: a review of Scandinavian studies. Sexually Transmitted Diseases 8(2, Suppl.): 140-155. April-June 1981.

362. MÅRDH, P.-A., RIPA, T., SVENSSON, L., and WESTRÖM, L. *Chlamydia trachomatis* infection in patients with acute salpingitis. New England Journal of Medicine 296(24): 1377-1379. June 16, 1977.

363. MÅRDH, P.-A. and WESTRÖM, L. Antibodies to *Mycoplasma hominis* in patients with genital infections and in healthy controls. British Journal of Venereal Diseases 46(5): 390-397. October 1970.

364. MÅRDH, P.-A. and WESTRÖM, L. Tubal and cervical cultures in acute salpingitis with special reference to *Mycoplasma hominis* and T-strain mycoplasmas. British Journal of Venereal Diseases 46(3): 179-186. June 1970.

365. MÅRDH, P.-A., WESTRÖM, L., MØLLER, B.R., and RIPA, K.T. Pelvic inflammatory disease: 2. Clinical, aetiological and pathophysiological studies. Geneva, World Health Organization, 1978. (INT/VDT/78.333) 12 p. (Mimeo)

366. MARRS, R.P. *In vitro* fertilization's future looks bright. Contemporary Ob/Gyn 20(3): 135-141. September 1982.

367. MASTROIANNI, L., Jr. Tubal occlusion. In: Keller, P.J., ed. Female infertility. Vol. 4. Basel, Switzerland, S. Karger, 1978. p. 114-131.

368. MATI, J.K.G., ANDERSON, G.E., CARTY, M.J., and MCGLASHAN, H.E. A second look into the problem of primary infertility in Kenya. East African Medical Journal 50(50): 94-97. February 1973.

369. MATTHEWS, C.D., GODFREY, B., and BROOM, T.J. Semen pathology, consistency and relationship to FSH in males attending an infertility service. Infertilty 4(2): 171-180. 1981.

370. MBURU, F.M. The need for research in family planning. Africa Link, December 1980. p. 3-5.

371. MCCORMACK, W.M. Sexually transmitted diseases: incidence and epidemiologic considerations. In: Sexually

transmitted disease. Los Angeles, Science and Medicine, 1979. p. 5-9.

372. MCCORMACK, W.M., LEE, Y.-H., LIN, J.-S., and RANKIN, J.S. Genital mycoplasmas in postpartum fever. Journal of Infectious Diseases 127(2): 193-196. February 1973.

*373. MCFALLS, J.A., Jr. Disease and fertility. New York, Academic Press, 1983. (In press)

374. MCFALLS, J.A., Jr. Frustrated fertility: a population paradox. Population Bulletin 34(2): 1-43. May 1979.

375. MCFALLS, J.A., Jr. Impact of VD on the fertility of the U.S. black population, 1880-1950. Social Biology 20(1): 2-19. March 1973.

376. MCFALLS, J.A., Jr. Psychopathology and subfecundity. New York, Academic Press, 1979. (Studies in Population) 264 p.

377. MCFALLS, J.A., Jr. Tuberculosis as a cause of subfecundity in current and historical societies. Presented at the 50th Annual Meeting of the Population Association of America, Washington, D.C., March 26-28, 1981. 38 p.

378. MCLAREN, D.S., WARD,P.G., NYABUZOKI, J.N., NDALAHWA, J.B., and WILFRED, E. Malarial infection of the placenta and foetal nutrition. East African Medical Journal 39(5): 182-189. May 1962.

379. MEDLAR, E.M., SPAIN, D.M., and HOLLIDAY, R.W. Postmortem compared with clinical diagnosis of genito-urinary tuberculosis in adult males. Journal of Urology 61(6): 1078-1088. June 1949.

380. MEHDI, Z., NAIDU, P.M., and RAO, V.G. Incidence and causes of perinatal mortality in Hyderabad, Andhra Pradesh, India. Indian Journal of Medical Research 49: 897-946. September 5, 1961.

*381. MEHEUS, A. Management of patients with STD-problems (practical approaches in developing nations). In: Holmes, K.K., Mårdh, P.-A., Sparling, P.F., and Wiesner, P.J., eds. Sexually transmitted diseases. New York, McGraw-Hill, 1983. (In press)

*382. MEHEUS, A.Z. Surveillance, prevention, and control of sexually transmitted agents associated with pelvic inflammatory disease. American Journal of Obstetrics and Gynecology 138(7, Pt. 2): 1064-1070. December 1, 1980.

383. MEHEUS, A., BALLARD, R., DLAMINI, M., URSI, J.P., DYCK, E. VAN, and PIOT, P. Epidemiology and aetiology of urethritis in Swaziland. International Journal of Epidemiology 9(3): 239-245. 1980.

384. MEHEUS, A., DYCK, E. VAN, and FRIEDMAN, F. Genital infections in Swaziland. Annales de la Société Belge de Médecine Tropicale, 62. 1982. (In press)

385. MEHEUS, A., FRIEDMAN, F., VAN DYCK, E., and GUYVER, T. Genital infections in prenatal and family planning attendants in Swaziland. East African Medical Journal 57(3): 212-217. March 1980.

386. MENCE, A.C., MEDLEY, N.E., MANGIONE, C.M., and DIETRICH, J.W. The incidence and influence of antisperm antibodies in infertile human couples on sperm-cervical mucus interactions and subsequent fertility. Fertility and Sterility 38(4): 439-446. October 1982.

387. MENKEN, J. [Princeton University] [Problems in assessing recent trends in US infertility prevalence from survey data] Personal communication, April 19, 1983.

388. MENNING, B.E. Emotional needs of infertile couples. In: Garcia, C.-R., Mastroianni, L., Jr., Amelar, R.D., and Dubin, L., eds. Current therapy of infertility: 1982-1983. Trenton, New Jersey, B.C. Decker, 1982. p. 231-23

389. MENNING, B.E. Psychosocial issues in donor insemination. In: Garcia, C.-R., Mastroianni, L., Jr., Amelar, R.D., and Dubin, L., eds. Current therapy of infertility: 1982-1983. Trenton, New Jersey, B.C. Decker, 1982. p. 244-247.

390. MERLE, F. and PEUCH-LESTRADE, P.-M. Gonococcie et stérilité au Cameroun. [Gonococcal diseases and sterility in Cameroon.] [FRE] Médecine Tropicale 20(6): 735-741. November-December 1960.

391. MEUWISSEN, J.H.J.M. Human infertility in West Africa. Tropical and Geographical Medicine 18(2): 147-152. June 1966.

392. MODAWI, O. The problem of infertility in western Equatoria. M.D. thesis, University of Khartoum, 1965. 149 p. (Unpublished)

393. MOGHISSI, K.S. Infertility. Kansas City, Missouri, American Academy of Family Physicians, 1978. (Family Practice Monograph No. 10) 19 p.

394. MOGHISSI, K.S. The neglected male. Fertility and Sterility 35(6): 609-610. June 1981.

395. MOGHISSI, K.S. Prediction and detection of ovulation. Fertility and Sterility 34(2): 89-98. August 1980.

396. MOGRA, N., DHRUVA, A., and KOTHARI, L.K. Nonspecific seminal tract infection and male infertility: a bacteriological study. Journal of Postgraduate Medicine 27(2): 99-104. April 1981.

397. MØLLER, B.R., FREUNDT, E.A., and MARDH, P.-A. Experimental pelvic inflammatory disease provoked by *Chlamydia trachomatis* and *Mycoplasma hominis* in grivet monkeys. American Journal of Obstetrics and Gynecology 138(7, Pt. 2): 990-995. December 1, 1980.

398. MOLNOS, A., ed. Cultural source materials for population planning in east Africa. Vol. 3. Nairobi, East African Publishing House, 1973. 451 p.

399. MONIF, G.R.G., ed. Infectious diseases in obstetrics and gynecology. Hagerstown, Maryland, Harper & Row, 1974. 470 p.

400. MONIF, G.R.G., WELKOS, S.L., BAER, H., and THOMPSON, R.J. Cul-de-sac isolates from patients with endometritis-salpingitis-peritonitis and gonococcal endocervicitis. American Journal of Obstetrics and Gynecology 126(2): 158-161. September 15, 1976.

*401. MOORE, D.E. and SPADONI, L.R. Infertility in women. In: Holmes, K.K., Mårdh, P.-A., Sparling, P.F., and Weisner, P.J., eds. Sexually transmitted diseases. New York, McGraw-Hill, 1983. (In press)

402. MOORE, G.R. Regional planning for infertility services. Presented at American Public Health Association Annual Meeting, November 1979. 17 p.

403. MOSHER, W.D. [US National Center for Health Statistics] [Changes in prevalence of infertility] Personal communication, March 23, 1983.

404. MOSHER, W.D. Infertility trends among U.S. couples: 1965-1976. Family Planning Perspectives 14(1): 22-27. January-February 1982.

405. MOSHER, W.D. and PRATT, W.F. Reproductive impairments among married couples: United States. Vital and Health Statistics Series 23, No. 11, December 1982. (DHHS No. [PHS] 83-1987) 51 p.

406. MOSLEY, W.H. The effects of nutrition on natural fertility. [ENG, summary in FRE] In: Leridon, H. and Menken, J., eds. Natural fertility. Fécondité naturelle. Liège, Belgium, Ordina Editions, 1979. p. 85-105.

407. MOSLEY, W.H., WERNER, L.H., and BECKER, S. The dynamics of birth spacing and marital fertility in Kenya. Voorsburg, Netherlands, International Statistical Institute, August 1982. (World Fertility Survey Scientific Report No. 30) 30 p.

408. MOUKTAR, M. Functional disorders due to bilharzial infection of the female genital tract. Journal of Obstetrics and Gynaecology of the British Commonwealth 73(2): 307-310. April 1966.

409. MOUTSINGA, H. La stérilité féminine au Gabon en consultation gynécologique journalière. [Female sterility in ordinary gynecologic practice in Gabon.] [FRE] Médecine d'Afrique Noire 20(2): 103-109. February 1973.

*410. MUIR, D.G. and BELSEY, M.A. Pelvic inflammatory disease and its consequences in the developing world. American Journal of Obstetrics and Gynecology 138(7, Pt. 2): 913-928. December 1, 1980.

411. MUSE, K.N. and WILSON, E.A. How does mild endometriosis cause infertility? Fertility and Sterility 38(2): 145-152. August 1982.

412. MUSTAFA, A.Z. Female circumcision and infibulation in the Sudan. Journal of Obstetrics and Gynaecology of the British Commonwealth 73: 302-306. April 1966.

413. NAEYE, R.L., TAFARI, N., MARBOE, C.C., and JUDGE, D.M. Causes of perinatal mortality in an African city. Bulletin of the World Health Organization 55(1): 63-65. 1977.

414. NAIR, B.K.H., VISWAM, M.P., NAIR, P.S., and PILLAI, R.K. Serological survey for syphilis in a family planning clinic. Indian Journal of Medical Research 62(12): 1826-1831. December 1974.

415. NAKAMURA, M.S., PORTO, L.R., Jr., and MUELLER, F. Etiologia da esterilidade conjugal no Departamento de Ginecologia da Faculdade de Medicina da Universidade de São Paulo. [Etiology of marital sterility in the Department of Gynecology of the Faculty of Medicine at the University of São Paulo.] [POR] 1971. 15 p. (Unpublished)

416. NARKAVONNAKIT, T. and BENNETT, T. Health consequences of induced abortion in rural northeast Thailand. Studies in Family Planning 12(2): 58-65. February 1981.

*417. NASAH, B.T. Aetiology of infertility in Cameroun. Nigerian Medical Journal 9(5-6): 601-605. May-June 1979.

418. NASAH, B.T. Infertility in sub-Sahara Africa. In: Waife, R.S. and Burkhart, M.C., eds. The nonphysician and family health in sub-Sahara Africa: proceedings of a conference. Chestnut Hill, Massachusetts, Pathfinder Fund, 1981. p. 22-27.

419. NASAH, B.T., AZEFOR, M.A.N., and ONDOA, B.N. Clinical and pathological conditions affecting fertility in Cameroon. In: Adadevoh, B.K., ed. Sub-fertility and infertility in Africa. Ibadan, Nigeria, Caxton Press, 1974. p. 75-78.

420. NASAH, B.T., AZEFOR, M.A.N., and ONDOA, B.N. Socio-cultural aspects of fertility in Cameroon. In: Adadevoh, B.K., ed. Sub-fertility and infertility in Africa. Ibadan, Nigeria, Caxton Press, 1974. p. 65-68.

421. NASAH, B.T. and COX, J.N. Vascular lesions in testes associated with male infertility in Cameroon: possible relationship to parasitic disease. Virchows Archiv. A. Pathological Anatomy and Histology 377(3): 225-236. 1978.

422. NASAH, B.T., NGUEMATCHA, R., EYONG, M., and GODWIN, S. Gonorrhea, *Trichomonas* and *Candida* among gravid and nongravid women in Cameroon. International Journal of Gynaecology and Obstetrics 18(1): 48-52. 1980.

423. NELSON, G.S. [Liverpool School of Tropical Medicine] [Infertility, schistosomiasis, and filariasis] Personal communication, October 25, 1982.

424. NEWMAN, P. Malaria control and population growth. Journal of Development Studies 6(2): 133-158. January 1970.

425. NEWTON, J.R. The investigation of the infertile couple: a critique of the currently available diagnostic tests. In: Diczfalusy, E., ed. Regulation of human fertility. [Proceedings of the World Health Organization Symposium on Advances in Fertility Regulation, Moscow, November 16-19, 1976] Copenhagen, Scriptor, 1977. p. 111-134.

426. NG, S.C., CHEW, P.C.T., RAUFF, A., and RATNAM, S.S. Hormone profiles of subfertile men. Singapore Journal of Obstetrics and Gynaecology 11(2): 53-55. July 1980.

427. NIKKANEN, V., TERHO, P., PUNNONEN, R., and MEURMAN, O. The significance of chlamydial genital infection in male infertility. Archives of Andrology 4(1): 57-61. February 1980.

428. NILSSON, S., EDVINSSON, A., and NILSSON, B. Improvement of semen and pregnancy rate after ligation and division of the internal spermatic vein: fact or fiction? British Journal of Urology 51(6): 591-596. December 1979.

429. NILSSON, S., OBRANT, K.O., and PERSSON, P.S. Changes in the testis parenchyma caused by acute nonspecific epididymitis. Fertility and Sterility 19(5): 748-757. September-October 1968.

430. NISBET, I.C.T. and KARCH, N.J. Chemical hazards to human reproduction. Park Ridge, New Jersey, Noyes Data Corporation, 1983. 245 p.

431. NOYES, R.W., HERTIG, A.T., and ROCK, J. Dating the endometrial biopsy. Fertility and Sterility 1(1): 3-25. 1950.

*432. NSANZE, H. Problems and approaches in the surveillance and control of sexually transmitted agents associated with pelvic inflammatory disease in Africa. American Journal of Obstetrics and Gynecology 138(7, Pt. 2): 1088-1090. December 1, 1980.

433. NSANZE, H., WAIGWA, S.R.N., MIRZA, N., PLUMMER, F., ROELANTS, P., and PIOT, P. Chlamydial infections in selected populations in Kenya. In: Mårdh, P.-A., Holmes, K.K., Oriel, J.D., Piot, P., and Schachter, J., eds. Chlamydial infections. New York, Elsevier Biomedical Press, 1982. p. 421-424.

434. OJO, O.A., ONIFADE, A., AKANDE, O., and BANNERMAN, R.H.O. The pattern of female genital tuberculosis in Ibadan. Israel Journal of Medical Sciences 7(2): 280-287. February 1971.

*435. OKOJIE, S.E. Induced illegal abortions in Benin City, Nigeria. International Journal of Gynaecology and Obstetrics 14(6): 517-521. 1976.

436. OLATUNBOSUN, D.A., BOLODEOKU, J.O., AROWOLO, O.O., and ADADEVOH, B.K. Infertility and subfertility in rural western Nigeria. Report to International Development Research Centre, Ottawa, Canada. January 1978. (IDRC-doc-109). 248 p. (Microfiche)

437. OLUSANYA, P.O. The problem of multiple causation in population analysis, with particular reference to the polygamy-fertility hypothesis. Sociological Review 19(2): 165-178. May 1971.

438. OLUSANYA, P.O. Reduced fertility and associated factors in the western state of Nigeria. In: Adadevoh, B.K., ed. Sub-fertility and infertility in Africa. Ibadan, Nigeria, Caxton Press, 1974. p. 43-53.

439. ONETTO, E. [University of Chile] [Abortion in Chile, 1964-1979 (Tables)] Personal communication to H. Davis, April 14, 1980. 43 p.

440. ONGOM, V.L., LWANGA, V.N., MUGISHA, J.K., and MAFIGIRI, J.T. Social background to venereal disease at Kasangati. East African Medical Journal 48(8): 367-371. August 1971.

441. ONIFADE, A. and OSOBA, A.O. Venereal diseases among women complaining of infertility. West African Medical Journal 23(2): 84-86. April 1975.

442. ORY, H.W. The noncontraceptive health benefits from oral contraceptive use. Family Planning Perspectives 14(4): 182-184. July-August 1982.

443. OSEGBE, D.N., AKINYANJU, O., and AMAKU, E.O. Fertility in males with sickle cell disease. Lancet 2(8241): 275-276. August 8, 1981.

444. OSOBA, A.O. Epidemiology of urethritis in Ibadan. British Journal of Venereal Diseases 48(2): 116-120. April 1972.

445. OSOBA, A.O. Microbiologic techniques for the diagnosis of pelvic inflammatory disease in developing countries. American Journal of Obstetrics and Gynecology 138(7, Pt. 2): 1091-1095. December 1, 1980.

446. OSOBA, A.O. and ONIFADE, A. Venereal diseases among pregnant women in Nigeria. West African Medical Journal 22(1): 23-25. February 1973.

447. OSSER, S., LIEDHOLM, P., and SJÖBERG, N.-O. Risk of pelvic inflammatory disease among users of intrauterine devices, irrespective of previous pregnancy. American Journal of Obstetrics and Gynecology 138(7, Pt. 2): 864-867. December 1, 1980.

448. OTTESON, E. [US National Institutes of Health Laboratory of Parasitology] [Filarial diseases and infertility] Personal communication, September 22, 1982.

449. OUMACHIGUI, A., BHATIA, V.N., and NAYAK, P.N. Toxoplasma antibodies and foetal wastage. Indian Journal of Medical Research 71: 522-525. April 1980.

450. OUNSTED, M. and SCOTT, A. Smoking during pregnancy. Acta Obstetricia et Gynecologica Scandinavica 61(4): 367-371. 1982.

451. OVIGSTAD, E., SKAUG, K., JERVE, F., VIK, I.S.S., and ULSTRUP, J.C. Therapeutic abortion and *Chlamydia trachomatis* infection. British Journal of Venereal Diseases 58(3): 182-183. June 1982.

*452. PAAVONEN, J. *Chlamydia trachomatis* in acute salpingitis. American Journal of Obstetrics and Gynecology 138(7, Pt. 2): 957-959. December 1, 1980.

453. PAAVONEN, J.A., SAIKKU, P., VESTERINEN, E., and LEHTOVIRTA, P. Infertility and cervical *Chlamydia trachomatis* infections. Acta Obstetricia et Gynecologica Scandinavica 58(3): 301-303. 1979.

454. PADUBIDRI, V., BAIJAL, L., PRAKASH, P., and CHANDRA, K. The detection of endometrial tuberculosis in cases of infertility by uterine aspiration cytology. Acta Cytologica 24(4): 319-324. July-August 1980.

455. PAN AMERICAN HEALTH ORGANIZATION. DIVISION OF DISEASE PREVENTION AND CONTROL. COMMUNICABLE DISEASE CONTROL. Sexually transmitted diseases. Epidemiological Bulletin 2(1): 1-4. 1981.

456. PATERSON, E.H. and RIFKIN, S.B. Epidemic disease control. In: Health care in China: an introduction. Geneva, Christian Medical Commission, 1974. p. 53-66.

457. PAULSEN, C.A. Diagnosis and management of male infertility. In: Diczfalusy, E., ed. Regulation of human fertility. [Proceedings of the World Health Organization Symposium on Advances in Fertility Regulation, Moscow, November 16-19, 1976] Copenhagen, Scriptor, 1977. p. 211-235.

458. PELFREY, R.J., OVERSTREET, J.W., and LEWIS, E.L. Abnormalities of sperm morphology in cases of persistent infertility after vasectomy reversal. Fertility and Sterility 38(1): 112-114. July 1982.

459. PEREZ SILVA, G., ELIZONDO ELIZONDO, F., GONZALEZ BRISENO, M.R., and ESPINOSA CAVAZOS, O.A. Factor masculino de esterilidad. [The male factor in sterilitiy.] [SPA] Ginecología y Obstetricia de México 47(284): 433-440. June 1980.

460. PERINE, P.L., BIDDLE, J.W., NSANZE, H., COSTA, L.J. D', OSOBA, A.O., and WIDY-WIRSKI, R. Gonococcal drug resistance and treatment of gonorrhoea in Nairobi. East African Medical Journal 57(4): 238-246. April 1980.

461. PERINE, P.L., DUNCAN, M.E., KRAUSE, D.W., and AWOKE, S. Pelvic inflammatory disease and puerperal sepsis in Ethiopia. 1. Etiology. American Journal of Obstetrics and Gynecology 138(7, Pt. 2): 969-973. December 1, 1980.

462. PHILIPP, E. The causes of male and female infertility. Midwife Health Visitor and Community Nurse 16(12): 486-502. December 1980.

463. PHILIPP, E.E. and CARRUTHERS, G.B. Infertility. London, William Heinemann Medical Books, 1981. 268 p.

464. PHILPOTT, R.H. Training programmes for students, doctors and others in community obstetrics. In: Philpott, R.H., ed. Maternity services in the developing world: what the community needs. London, Royal College of Obstetricians and Gynaecologists, September 1979. p. 241-245.

465. PIERREPOINT, C.G., JENKINS, B.M., WILSON, D.W., PHILLIPS, M.J., and GOW, J.G. An examination of blood steroid and gonadotropin concentrations in relation to fertility status and testicular function in men. Fertility and Sterility 38(4): 465-470. October 1982.

466. PIETERS, G. and LOWENFELS, A.B. Infibulation in the horn of Africa. New York State Journal of Medicine 77(5): 729-731. April 1977.

467. PIETERSE, H.F. Some aspects of urological disease among the indigenous peoples of South West Africa: 4. Bilharziasis and urogenital tuberculosis. South African Medical Journal 47(49): 2415-2419. December 1973.

468. PLORDE, D.S. Sexually transmitted diseases in Ethiopia. British Journal of Venereal Diseases 57(6): 357-362. December 1981.

469. POMERANCE, W. Chorioamnionitis and maternal sepsis. In: Monif, G.R.G., ed. Infectious diseases in obstetrics and gynecology. Hagerstown, Maryland, Harper & Row, 1974. p. 292-300.

470. POPULATION INFORMATION PROGRAM. [Infertility service availability in developing countries: responses to survey of 21 physicians attending courses on the Management of the Infertile Couple conducted by Johns Hopkins Program for International Education in Gynecology and Obstetrics, September 13-24, 1982.] 42 p. (Unpublished)

471. POSTIC, B., SINGH, B., SQUEGLIA, N.L., and GUEVARRA, L.O. Inactivation of clinical isolates of *Herpesvirus hominis*, types 1 and 2, by chemical contraceptives. Sexually Transmitted Diseases 5(1): 22-24. January-March 1978.

472. POTTS, M. [Appropriate obstetrics] [Memorandum] January 24, 1980. 10 p. (Unpublished)

473. POTTS, M. and SELMAN, P. Society and fertility. Estover, UK, Macdonald and Evans, 1979. 374 p.

474. PRITCHARD, J.A. and MACDONALD, P.C. Williams obstetrics. 16th ed. New York, Appleton-Century-Crofts, 1980. 1179 p.

475. PUNNONEN, R., TERHO, P., NIKKANEN, V., and MEURMAN, O. Chlamydial serology in infertile women by immunofluorescence. Fertility and Sterility 31(6): 656-659. June 1979.

476. QUAGLIARELLO, J. and WEISS, G. Clomiphene citrate in the management of infertility associated with shortened luteal phases. Fertility and Sterility 31(4): 373-377. April 1979.

477. QUINN, P.A., SHEWCHUK, A.B., SHUBER, J., LIE, K.I., RYAN, E., SHEU, M., and CHIPMAN, M.L. Serologic evidence of *Ureaplasma urealyticum* infection in women with spontaneous pregnancy loss. American Journal of Obstetrics and Gynecology 145(2): 245-250. January 15, 1983.

478. RADBERG, T. and HAMBERGER, L. *Chlamydia trachomatis* in relation to infections following first trimester abortions. [Abstract] Acta Obstetricia et Gynecologica (Suppl. 93): 54. 1980.

479. RAJAN, R. and MARY, T.S. Laparoscopy/laparotomy evaluation of artificial donor insemination failures. Journal of the Indian Medical Association 79(4): 50-53. August 16, 1982.

*480. RAJAN, V.S. Problems in the surveillance and control of sexually transmitted agents associated with pelvic inflammatory disease in the Far East. American Journal of Obstetrics and Gynecology 138(7, Pt. 2): 1071-1077. December 1, 1980.

481. RAJAN, V.S. Sexually transmitted diseases on a tropical island. British Journal of Venereal Diseases 54(3): 141-143. June 1978.

482. RAJAN, V.S., THIRUMOORTHY, T., and TAN, N.J. Epidemiology of penicillinase-producing *Neisseria gonorrhoeae* in Singapore. British Journal of Venereal Diseases 57(3): 158-161. June 1981.

483. RATNAM, A.V. [University of Zambia] [Congenital syphilis] Personal communication, November 17, 1982.

*484. RATNAM, A.V., DIN, S.N., and CHATTERJEE, T.K. Gonococcal infection in women with pelvic inflammatory disease in Lusaka, Zambia. American Journal of Obstetrics and Gynecology 138(7, Pt. 2): 965-968. December 1, 1980.

*485. RATNAM, S.S., CHEW, P.C.T., and TSAKOK, M. Experience of a comprehensive infertility clinic in the Department of Obstetrics and Gynaecology, University of Singapore. Singapore Medical Journal 17(3): 157-159. September 1976.

486. REES, E., DAVIES, J.A., BRADLEY, M.G., HOBSON, D., BYNG, R.E., and KARAYIANNIS, P. *Chlamydia trachomatis* in relation to post-gonococcal cervicitis. In: Mårdh, P.-A., Holmes, K.K., Oriel, J.D., Piot, P., and Schachter, J., eds. Chlamydial infections. New York, Elsevier Biomedical Press, 1982. p. 147-150.

487. REID, D.E., RYAN, K.J., and BENIRSCHKE, K. Principles and management of human reproduction. Philadelphia, W.B. Saunders, 1972. 915 p.

488. REINIG, E. and HEIDBREDER, G.A. Breakthrough in VD education in Los Angeles County. Public Health Reports 82(6): 505-512. June 1967.

489. RENDON, A.L., COVARRUBIAS, J., MCCARNEY, K.E., MARION-LANDAIS, G., and LUNA DEL VILLAR, J. A controlled, comparative study of phenylmercuric acetate, nonoxynol-9 and placebo vaginal suppositories as prophylactic agents against gonorrhea. Current Therapeutic Research 27(6, Section 1): 780-783. June 1980.

490. RENDTORFF, R.C., PACKER, H., GLASSCO, S., and LEVY, J. The impact of urban community hospital surveillance for gonorrhoea on the infection rate and complications in the female: a progress report. British Journal of Venereal Diseases 53(6): 364-367. December 1977.

*491. RESOLVE, INC. Resolve Newsletter. December 1982. 8 p.

*492. RETEL-LAURENTIN, A. Causes de l'infécondité dans la Volta Noire. [Causes of infertility in the Black Volta region.] [FRE] Paris, Institut National d'Etudes Démographiques, 1979. (Travaux et Documents Cahier No. 87) 100 p.

493. RETEL-LAURENTIN, A. Evaluation du rôle de certaines maladies dans l'infécondité: un exemple africain. [Appraising the role of certain diseases in infertility: an African example.] [FRE, summaries in ENG, SPA] Population 33(1): 101-119. January-February 1978.

494. RETEL-LAURENTIN, A. Fécondité et syphilis dans la région de la Volta Noire. [Fertility and syphilis in the Black Volta region.] [FRE, summaries in ENG, SPA] Population 28(4-5): 793-815. July-October 1973.

*495. RETEL-LAURENTIN, A. Infécondité en Afrique noire: maladies et conséquences sociales. [Infertility in black Africa: diseases and social consequences.] [FRE] Paris, Masson, 1974. 188 p.

496. RETEL-LAURENTIN, A. Infécondité et maladies: un exemple centrafricain, les Nzakara. [Infertility and disease: a Central African example, the Nzakara.] [FRE] Paris, I.N.S.E.E., 1975.

497. RETEL-LAURENTIN, A. [Centre national de recherches scientifiques] [Infertility in Africa] Personal communication, April 29, 1983.

498. RETEL-LAURENTIN, A. Un pays à la dérive: infécondité dans l'est de la Republique Centrafricaine. [A country adrift: infertility in the eastern Central African Republic.] [FRE] Paris, J.P. Delarge, 1978. 286 p.

499. RETEL-LAURENTIN, A. Problèmes sociaux et familiaux des régions africaines à faible fécondité. [Social and familial problems in low fertility regions of Africa.] [FRE, summary in ENG] In: Oppong, C., Adaba, G., Bekombo-Priso, M., and Mogey, J., eds. Marriage, fertility and parenthood in west Africa. Canberra, Australian National University, 1978. (Changing African Family Project Mongraph Series No. 4, Pt. 2) p. 507-519.

500. RETEL-LAURENTIN, A. Quelques éléments de la fécondité naturelle dans deux populations africaines à faible fécondité. [Some components of natural fertility in two African populations with low fertility.] [FRE, summary in ENG] In: Leridon, H. and Menken, J., eds. Natural fertility. Fécondité naturelle. Liège, Belgium, Ordina Editions, 1979. p. 373-396.

501. RETEL-LAURENTIN, A. Tackling the scourge of infertility. People 8(1): 13-15. 1981.

502. REYNOLDS, G.H., ZAIDI, A.A., THORNSBERRY, C., GUINAN, M., BIDDLE, J., WIESNER, P.J., and COOPERATIVE STUDY GROUP. The national gonorrhea therapy monitoring study: 2. Trends and seasonality of antibiotic resistance of *Neisseria gonorrhoeae*. Sexually Transmitted Diseases 6(2, Suppl.): 103-111. April-June 1979.

503. RICHART, R.M. Is short luteal phase the infertility problem? Contemporary Ob/Gyn 20(2): 187-196. August 1982.

504. RING, A. and SCRAGG, R. A demographic and social study of fertility in rural New Guinea. Journal of Biosocial Science 5(1): 89-121. January 1973.

505. RIOUX, J.-E. and YUZPE, A.A. Hysterosalpingography: a pictorial essay. Contemporary Ob/Gyn 17: 41-50. May 1981.

506. RIPA, K.T., SVENSSON, L., TREHARNE, J.D., WESTRÖM, L., and MARDH, P.-A. *Chlamydia trachomatis* infection in patients with laparoscopically verified acute salpingitis: results of isolation and antibody determinations. American Journal of Obstetrics and Gynecology 138(7, Pt. 2): 960-964. December 1, 1980.

507. RITTER, P.L. Adoption on Kosrae Island: solidarity and sterility. Ethnology 20(1): 45-61. January 1981.

508. ROBBINS, J.B. Problems posed by potential gonococcal vaccines viewed from the vantage point of a control agency. British Journal of Venereal Diseases 53(3): 170-172. June 1977.

509. ROBERTSON, J.S. Excessive perinatal mortality in a small town associated with evidence of toxoplasmosis. British Medical Journal 3(5192): 91-96. June 9, 1960.

*510. ROCK, J.A., KATAYAMA, K.P., MARTIN, E.J., WOODRUFF, J.D., and JONES, H.W., Jr. Factors influencing the success of salpingostomy techniques for distal fimbrial obstruction. Obstetrics and Gynecology 52(5): 591-596. November 1978.

511. ROCK, J.A. and ZACUR, H.A. The clinical management of repeated early pregnancy wastage. Fertility and Sterility 39(2): 123-140. February 1983.

512. RODRIGUEZ-RIGAU, L.J., SMITH, K.D., and STEINBERGER, E. Cigarette smoking and semen quality. Fertility and Sterility 38(1): 115-116. July 1982.

513. RODRIGUEZ-RIGAU, L.J., SMITH, K.D., and STEINBERGER, E. Relationship of varicocele to sperm output and fertility of male partners in infertile couples. Journal of Urology 120(6): 691-694. December 1978.

514. ROM, W.N. Effects of lead on the female and reproduction: a review. Mount Sinai Journal of Medicine 43(5): 542-552. September-October 1976.

515. ROMANIUK, A. La fécondité des populations congolaises. [The fertility of the Congolese populations.] [FRE] Paris, Institut de Recherches Economiques et Sociales, Université Lovanium de Kinshasa, 1967. (Recherches Africaines 4) 348 p.

516. ROMANIUK, A. Increase in natural fertility during the early stages of modernization: evidence from an African case study, Zaire. Population Studies 34(2): 293-310. July 1980.

517. ROMANIUK, A. Infertility in tropical Africa. In: Caldwell, J.C. and Okonjo, C., eds. The population of tropical Africa. London, Longmans, 1968. p. 214-224.

518. ROSETT, H.L., WEINER, L., LEE, A., ZUCKERMAN, B., DOOLING, E., and OPPENHEIMER, E. Patterns of alcohol consumption and fetal development. Obstetrics and Gynecology 61(5): 539-546. May 1983.

519. ROSS, J.C., GOW, J.G., and ST. HILL, C.A. Tuberculous epididymitis: a review of 170 patients. British Journal of Surgery 48(212): 663-666. May 1961.

520. ROVINSKY, J.J. Diseases complicating pregnancy. In: Romney, S.L., Gray, M.J., Little, A.B., Merrill, J.A., Quilligan, E.J., and Stander, R.W., eds. Gynecology and obstetrics: the health care of women. 2nd. ed. New York, McGraw-Hill, 1981. p. 697-803.

521. ROWLEY, M.J., LEACH, D.R., WARNER, G.A., and HELLER, C.G. Effect of graded doses of ionizing radiation on the human testis. Radiation Research 59(3): 665-678. September 1974.

522. ROZENBERG, M., COHEN, J., and LOFFREDO, V. Essai d'évaluation du coût médical d'un traitement de stérilité: coût d'un enfant "stérilité". [An evaluation of the medical costs of a treatment for sterility: the cost of a "sterility" baby.] [FRE, summary in ENG] Contraception–Fertilité–Sexualité 8(1): 31-46. January 1980.

523. ROZIN, S. Genital tuberculosis. In: Behrman, S.J. and Kistner, R.W., eds. Progress in infertility. Boston, Little, Brown, 1968. p. 209-238.

524. RUBIN, G.L., ORY, H.W., and LAYDE, P.M. Oral contraceptives and pelvic inflammatory disease. American Journal of Obstetrics and Gynecology 144(6): 630-635. November 15, 1982.

525. RUSHWAN, H. Etiologic factors in pelvic inflammatory disease in Sudanese women. American Journal of Obstetrics and Gynecology 138(7, Pt. 2): 877-879. December 1, 1980.

526. SAHA, K. and GUPTA, I. Immunologic aspects of leprosy with special reference to the circulating antispermatozoal antibodies. International Journal of Leprosy 45(1): 28-37. January-March 1977.

527. ST. JOHN, R.K., BLOUNT, J., and JONES, O. Pelvic inflammatory disease in the United States: incidence and trends in private practice. Sexually Transmitted Diseases 8(2): 56-61. April-June 1981.

*528. ST. JOHN, R.K., BROWN, S.T., and TYLER, C.W., Jr. Pelvic inflammatory disease, 1980. American Journal of Obstetrics and Gynecology 138(7, Pt. 2): 845-847. December 1, 1980.

529. ST. JOHN, R.K., JONES, O.G., BLOUNT, J.H., and ZAIDI, A.A. Pelvic inflammatory disease in the United States: epidemiology and trends among hospitalized women. Sexually Transmitted Diseases 8(2): 62-66. April-June 1981.

530. SALA-DIAKANDA, M. Problèmes d'infécondité et de sous-fécondité en Afrique centrale et de l'ouest. [Problems of infertility and sub-fertility in west and central Africa.] [FRE, summary in ENG] In: International population conference. Congress international de la population. Vol. 3. (Papers of the 19th General Conference of the International Union for the Scientific Study of Population) Liège, Belgium, Ordina Editions, [1981]. p. 643-666.

531. SANCHEZ ESCOBAR, F., RIOS OSORIO, J. DE LOS, GARCIA GOMEZ, J.E., MEJIA RESTREPO, J.M., and MEJIA, W. Estudio de la pareja estéril. [Study of the sterile couple.] [SPA] Revista Colombiana de Obstetricia y Ginecología 32(2): 84-103. [1979].

532. SATTI, M.H., MODAWI, O., DARAG, S., MAHMUD, A., HASSAN, S.M., and RAMZI, M. Preliminary report on the Murle infertility study. [1979]. 50 p. (Unpublished)

533. SCHACHTER, J. Chlamydial infections. Pt. 1. New England Journal of Medicine 298(8): 428-435. February 23, 1978.

534. SCHACHTER, J. Chlamydial infections. Pt. 2. New England Journal of Medicine 298(9): 490-495. March 2, 1978.

535. SCHACHTER, J. Chlamydial infections. Pt. 3. New England Journal of Medicine 298(10): 540-549. March 9, 1978.

536. SCHACHTER, J., HANNA, L., HILL, E.C., MASSAD, S., SHEPPARD, C.W., CONTE, J.E., Jr., COHEN, S.N., and MEYER, K.F. Are chlamydial infections the most prevalent venereal disease? Journal of the American Medical Association 231(12): 1252-1255. March 24, 1975.

537. SCHAEFER, G. Female genital tuberculosis. Clinical Obstetrics and Gynecology 19(1): 223-239. March 1976.

538. SCHAEFER, G. Full term pregnancy following genital tuberculosis. Obstetrical and Gynecological Survey 19: 81-124. 1964.

539. SCHENKER, J.G. and MARGALIOTH, E.J. Intrauterine adhesions: an updated appraisal. Fertility and Sterility 37(5): 593-610. May 1982.

540. SCHWARTZ, D., MACDONALD, P.D.M., and HEUCHEL, V. Fecundability, coital frequency and the viability of ova. Population Studies 34(2): 397-400. July 1980.

541. SCHWIMMER, W.B., USTAY, K.A., and BEHRMAN, S.J. An evaluation of immunologic factors of infertility. Fertility and Sterility 18(2): 167-180. March-April 1967.

542. SCRAGG, R.F.R. Depopulation in New Ireland: a study of demography and fertility. Sydney, Australia, McTaggart and Corish, [1957]. 144 p.

543. SEIBEL, M.M., BERGER, M.J., WEINSTEIN, F.G., and TAYMOR, M.L. The effectiveness of Danazol on subsequent fertility in minimal endometriosis. Fertility and Sterility 38(5): 534-537. November 1982.

544. SEIBEL, M.M. and TAYMOR, M.L. Emotional aspects of infertility. Fertility and Sterility 37(2): 137-145. February 1982.

545. SENANAYAKE, P. Key issues in family planning in the 1980s. In: Jelliffe, D.B. and Jelliffe, E.F., eds. Advances in international maternal and child health. Vol. 1. New York, Oxford University Press, 1981. p. 43-81.

*546. SENANAYAKE, P. and KRAMER, D.G. Contraception and the etiology of pelvic inflammatory disease: new perspectives. American Journal of Obstetrics and Gynecology 138(7, Pt. 2): 852-860. December 1, 1980.

547. SERMENT, H., RAMI, M., and DUPREZ, D. Stérilité et avortement. [Sterility and abortion.] [FRE] Feuillets du Practicien 3(15): 25-29. October 12, 1979.

548. SHAARAWY, M. and MAHMOUD, K.Z. Endocrine profile and semen characteristics in male smokers. Fertility and Sterility 38(2): 255-257. August 1982.

549. SHAH, H.M., PATEL, S., and NAGPAL, S. Pelvic inflammation: a study of 800 cases. Journal of Obstetrics and Gynaecology of India 28(3): 429-435. June 1978.

550. SHAPIRO, S.R. and BRESCHI, L.C. Acute epididymitis in Vietnam: review of 52 cases. Military Medicine 138(10): 643-645. October 1973.

551. SHAW, R.W. Primary and secondary health care treatment of infertility: when to refer? [1982]. 5 p. (Unpublished)

552. SHEPARD, M.K. Abnormal reproductive endocrine function and infertility. In: Huff, R.W. and Pauerstein, C.J., eds. Human reproduction: physiology and pathophysiology. New York, John Wiley, 1979. 61-98.

553. SHEPARD, M.K. Infertility. In: Shain, R.N. and Pauerstein, C.J., eds. Fertility control: biologic and behavioral aspects. Hagerstown, Maryland, Harper & Row, 1980. p. 57-70.

*554. SHERRIS, J.D., LEWISON, D., and FOX, G. Update on condoms — products, protection, promotion. Population Reports, Series H, No. 6. Baltimore, Johns Hopkins University, Population Information Program, September-October 1982. 36 p.

555. SHULMAN, S. Immunologic barriers to fertility. Obstetrical and Gynecological Survey 27(8): 553-606. 1972.

556. SHULMAN, S. Sperm immunity and human infertility: problems and progress. [ENG, summary in RUS] In: Bratanov, K., ed. Immunology of reproduction. (Proceedings of the Third International Symposium, Varna, Bulgaria, September 21-25, 1975) Sofia, Publishing House of the Bulgarian Academy of Sciences, 1978. p. 43-63.

557. SIEBER, O.F., Jr., FULGINITI, V.A., BRAZIE, J., and UMLAUF, H.J. In utero infection of the fetus by *Herpes simplex* virus. Journal of Pediatrics 69(1): 30-34. July 1966.

558. SILBER, S.J. Reversal of vasectomy and the treatment of male infertility: role of microsurgery, vasoepididymostomy, and pressure-induced changes of vasectomy. Urologic Clinics of North America 8(1): 53-62. February 1981.

559. SIMPSON-HERBERT, M., PIOTROW, P.T., CHRISTIE, L.J., and STREICH, J. Traditional midwives and family planning. Population Reports, Series J, No. 22. Baltimore, Johns Hopkins University, Population Information Program, May 1980. 56 p.

*560. SINGH, B. and CUTLER, J.C. Vaginal contraceptives for prophylaxis against sexually transmissible diseases. In: Zatuchni, G.I., Sobrero, A.J., Speidel, J.J., and Sciarra, J.J., eds. Vaginal contraception: new developments. Hagerstown, Maryland, Harper & Row, 1979. p. 175-185.

561. SINNATHURAY, T.A., YUSOF, K., PALAN, V.T., FONG, C.K., ADEEP, N., CHONG, C.H., and YIP, Y.C. Pattern of acute pelvic inflammatory disease in abortion-related admissions. American Journal of Obstetrics and Gynecology 138(7, Pt. 2): 868-871. December 1, 1980.

562. SLONE, D., SISKIND, V., HEINONEN, O.P., MONSON, R.R., KAUFMAN, D.W., and SHAPRIO, S. Aspirin and congenital malformations. Lancet 1(7974): 1373-1375. June 26, 1976.

563. SMITH, C.G. Drug effects on male sexual function. Clinical Obstetrics and Gynecology 25(3): 525-531. September 1982.

564. SMITH, D.G. and GUINTO, R.S. Leprosy and fertility. Human Biology 50(4): 451-460. December 1978.

565. SMITH, E.S.O. An overview of venereal disease programs in Britain, West Germany, Denmark, and Sweden, with implications for Canada. Bulletin of the Pan American Health Organization 10(4): 321-332. 1976.

566. SMITH, J.H., DYCK, J.R., and CONNOR, D.H. Autopsy analysis of disease frequency in Kinshasa, Republic of Zaire. American Journal of Tropical Medicine and Hygiene 25(4): 637-643. July 1976.

567. SMITH, K.D., RODRIGUEZ-RIGAU, L.J., and STEINBERGER, E. Relation between indices of semen analysis and pregnancy rate in infertile couples. Fertility and Sterility 28(12): 1314-1319. December 1977.

568. SMITH, K.D., STULTZ, D.R., JACKSON, J.R., and STEINBERGER, E. Evaluation of sperm counts and total sperm counts in 2543 men requesting vasectomy. Andrologia 10(5): 362-368. September-October 1978.

569. SOETADJI, N., TRASTOTENOJO, M.S., HARIJONO, R., DARSONO, S., ALFINAH, S., and WASPODO, D. Adoption at Dr. Kariadi Hospital, Semarang. Paediatrica Indonesiana 16(9-10): 299-304. September-October 1976.

570. SOGBETUN, A.O., ALAUSA, K.O., and OSOBA, A.O. Sexually transmitted diseases in Ibadan, Nigeria. British Journal of Venereal Diseases 53(3): 155-160. June 1977.

571. SOGBETUN, A.O. and OSOBA, A.O. Trichomonal urethritis in Nigerian males. Tropical and Geographical Medicine 26(3): 319-324. September 1974.

572. SOKOL, R.J. Alcohol and spontaneous abortion. [Letter] Lancet 2(8203): 1079. November 15, 1980.

*573. SØRENSEN, S.S. Infertility factors. Acta Obstetricia et Gynecologica Scandinavica 59(6): 513-520. 1980.

574. SOUTHERN, P.M., Jr. Habitual abortion and toxoplasmosis: is there a relationship? Obstetrics and Gynecology 39(1): 45-47. January 1972.

575. SOWMINI, C.N. Community education in sexually transmitted diseases: an experimental study. Asian Journal of Infectious Diseases 1(1-2): 52-54. June-September 1977.

576. SPEICHINGER, J.P. and MATTOX, J.H. Homologous artificial insemination and oligospermia. Fertility and Sterility 27(2): 135-138. February 1976.

577. SPENCE, M. [Herpes]. [Excerpts from presentation at Johns Hopkins Program for International Education in Gynecology and Obstetrics Course on Promoting Health Through Management of Sexually Transmitted Diseases, Baltimore, October 29, 1982].

578. SPIRA, A., MAYAUX, M.-J., SCHWARTZ, D., JOUANNET, P., CZYGLICK, F., and DAVID, G. Quelques aspects méthodologiques d'une enquête rétrospective comparant 484 hommes féconds et 2,768 hommes inféconds. [Methodological aspects of a retrospective study on 484 fertile and 2,768 infertile men.] [FRE, summary in ENG] Revue d'Epidémiologie et de Santé Publique 28(1): 13-20. 1980.

579. SPITZ, A.J.W. Malaria infection of the placenta and its influence on the incidence of prematurity in eastern Nigeria. Bulletin of the World Health Organization 21(2): 242-244. 1959.

580. STAGE, A.H., BROOKS, G.G., SANDERS, Z.G., and WATERFALLEN, J.W. A retrospective study on the effectiveness of a screening effort to reduce the complications of gonorrhea. Sexually Transmitted Diseases 3(2, Pt. 1): 61-64. December 1976.

581. STEIMAN, R.P. and TAYMOR, M.L. Artificial insemination homologous and its role in the management of infertility. Fertility and Sterility 28(2): 146-150. February 1977.

582. STEIN, Z. and SUSSER, M. Famine and fertility. In: Mosley, W.H., ed. Nutrition and human reproduction. New York, Plenum Press, 1978. p. 123-145.

583. STEINBERGER, E. Male reproductive physiology. In: Crockett, A.T.K. and Urry, R.L., eds. Male infertility. New York, Grune and Stratton, 1977. p. 1-25.

584. STEPTOE, P.C. and EDWARDS, R.G. Birth after the reimplantation of a human embryo. [Letter] Lancet 2(8085): 366. August 12, 1978.

585. STEWART, D.B. Complications of the puerperium. In: Lawson, J.B. and Stewart, D.B., eds. Obstetrics and gynaecology in the tropics and developing countries. London, Edward Arnold, 1967. p. 242-252.

586. STRATHY, J.H., MOLGAARD, C.A., COULAM, C.B., and MELTON, L.J., 3rd. Endometriosis and infertility: a laparoscopic study of endometriosis among fertile and infertile women. Fertility and Sterility 38(6): 667-672. December 1982.

587. STRAY-PEDERSEN, B. Cost-benefit analysis of a prenatal preventive programme against congenital syphilis. NIPH Annals 3(1): 57-66. May 1980.

588. STRAY-PEDERSEN, B., ENG, J., and REIKVAM, T.M. Uterine T-mycoplasma colonization in reproductive failure. American Journal of Obstetrics and Gynecology 130(3): 307-311. February 1, 1978.

589. STUMPF, P.G., MANUEL, M.L., and GOLDY, A.S. Regionalization of infertility services in a rural area. [1979]. 22 p. (Unpublished)

590. SUJPLUEM, C., KANCHANASINITH, K., and NARKAVONAKIT, T. Thailand: utilization of TBAs in family planning and maternal child care. In: Mangay-Maglacas, A. and Pizurki, H., eds. The traditional birth attendant in seven countries: case studies in utilization and training. Geneva, World Health Organization, 1981. p. 167-204.

591. SVENSSON, L., WESTRÖM, L., RIPA, K.T., and MARDH, P.-A. Differences in some clinical and laboratory parameters in acute salpingitis related to culture and serologic findings. American Journal of Obstetrics and Gynecology 138(7, Pt. 2): 1017-1021. December 1, 1980.

592. SWEET, R.L. Chlamydial salpingitis and infertility. [Editorial] Fertility and Sterility 38(5): 530-533. November 1982.

593. SWEET, R.L. Pelvic inflammatory disease: etiology, diagnosis, and treatment. Sexually Transmitted Diseases 8(4, Suppl.): 308-315. October-December 1981.

594. SWEET, R.L., DRAPER, D.L., SCHACHTER, J., JAMES, J., HADLEY, W.K., and BROOKS, G.F. Microbiology and pathogenesis of acute salpingitis as determined by laparoscopy: what is the appropriate site to sample? American Journal of Obstetrics and Gynecology 138(7, Pt. 2): 985-989. December 1, 1980.

595. SWEET, R.L., MILLS, J., HADLEY, K.W., BLUMENSTOCK, E., SCHACHTER, J., ROBBIE, M.O., and DRAPER, D.L. Use of laparoscopy to determine the microbiologic etiology of acute salpingitis. American Journal of Obstetrics and Gynecology 134(1): 68-74. May 1, 1979.

596. TABUTIN, D. Evolution régionale de la fécondité dans l'ouest du Zaïre. [Regional changes in fertility in western Zaire.] [FRE] Population 1: 29-50. 1982.

597. TABUTIN, D. Tendances et niveaux de la fécondité au Zaïre. [Levels and tendencies of fertility in Zaire.] [FRE] Presented at Congrès de démographie africain, Abidjan, January 1979. (Working Paper No. 54). September 1978. 36 p.

598. TAYLOR-ROBINSON, D. and MCCORMACK, W.M. The genital mycoplasmas. Pt. 1. New England Journal of Medicine 302(18): 1003-1010. May 1, 1980.

599. TAYLOR-ROBINSON, D. and MCCORMACK, W.M. The genital mycoplasmas. Pt. 2. New England Journal of Medicine 302(19): 1063-1067. May 8, 1980.

600. TAYMOR, M.L. Infertility. New York, Grune & Stratton, 1978. 216 p.

601. TAYMOR, M.L. and BRESNICK, E. Emotional stress and infertility. Infertility 2(1): 39-47. 1979.

602. TEMPLETON, A.A. and PENNEY, G.C. The incidence, characteristics, and prognosis of patients whose infertility is unexplained. Fertility and Sterility 37(2): 175-182. February 1982.

603. TESTART, J., LASSALLE, B., and FRYDMAN, R. Apparatus for the *in vitro* fertilization and culture of human oocytes. Fertility and Sterility 38(3): 372-375. September 1982.

*604. THOMAS, A.K. and FORREST, M.S. Infertility: a review of 291 infertile couples over eight years. Fertility and Sterility 34(2): 106-111. August 1980.

605. THORNER, M.O. Hyperprolactinaemia and ovulation. In: Crighton, D.B., Foxcroft, G.R., Haynes, N.B., and Lamming, G.E., eds. Control of ovulation. Boston, Butterworths, 1978. p. 397-409.

606. TIETZE, C., GUTTMACHER, A.F., and RUBIN, S. Time required for conception in 1727 planned pregnancies. Fertility and Sterility 1(4): 338-346. 1950.

*607. TORRE, L.A. DE LA. Problems and proposals for the surveillance and control of sexually transmitted diseases associated with pelvic inflammatory disease in South America. American Journal of Obstetrics and Gynecology 138(7, Pt. 2): 1078-1081. December 1, 1980.

608. TOTH, A., LESSER, M.L., BROOKS, C., and LABRIOLA, D. Subsequent pregnancies among 161 couples treated for T-mycoplasma genital-tract infection. New England Journal of Medicine 308(9): 505-507. March 3, 1983.

609. TOTH, A., O'LEARY, W.M., and LEDGER, W. Evidence for microbial transfer by spermatozoa. Obstetrics and Gynecology 59(5): 556-559. May 1982.

610. TOZZO, P.J. Semen analysis in unilateral epididymitis. New York State Journal of Medicine 68(21): 2769-2770. November 1, 1968.

611. TREDWAY, D.R. The interpretation and significance of the fractional postcoital test. American Journal of Obstetrics and Gynecology 124(4): 352-355. February 15, 1976.

612. TREHARNE, J.D., RIPA, K.T., MARDH, P.-A., SVENSSON, L., WESTRÖM, L., and DAROUGAR, S. Antibodies to *Chlamydia trachomatis* in acute salpingitis. British Journal of Venereal Diseases 55(1): 26-29. February 1979.

613. TRIMBOS-KEMPER, T., TRIMBOS, B., and HALL, E. VAN. Etiological factors in tubal infertility. Fertility and Sterility 37(3): 384-388. March 1982.

614. TROEN, P. and OSHIMA, H. The male factor. New England Journal of Medicine 303(13): 751-752. September 25, 1980.

615. TROUNSON, A.O., LEETON, J.F., WOOD, C., WEBB, J., and WOOD, J. Pregnancies in humans by fertilization *in vitro* and embryo transfer in the controlled ovulatory cycle. Science 212(4495): 681-682. May 8, 1981.

616. TRUSSELL, R.R. Pelvic inflammatory disease. Proceedings of the Royal Society of Medicine 6[illegible] 365-368. April 1968.

617. TULANDI, T., ARRONET, G.H., and MCINNES, R.A. Infertility in women over the age of 36. Fertility and Sterility 35(6): 611-614. June 1981.

618. TURSZ, A., RUMEAU-ROUQUETTE, C., and LANGUILLAT, G. Enquête sur l'étiologie de l'hypofécondité au Gabon oriental: 2. Résultats en fonction du lieu d'habitat et de l'ethnie. [Etiological study of low fertility in eastern Gabon: 2. Results according to the geographical distribution and the ethnic group.] [FRE, summary in ENG] Revue d'Epidémiologie et de Santé Publique 26(3): 259-271. 1978.

619. UNITED KINGDOM. DEPARTMENT OF HEALTH AND SOCIAL SECURITY. CHIEF MEDICAL OFFICER. Sexually transmitted diseases. British Journal of Venereal Diseases 56(3): 178-181. June 1978.

620. UNITED STATES. BUREAU OF THE CENSUS. Fertility of American women: June 1980. Current Population Reports, Series P-20, No. 375, October 1982. p. 41-43.

621. UNITED STATES. DEPARTMENT OF HEALTH AND HUMAN SERVICES. BUREAU OF COMMUNITY HEALTH SERVICES [BCHS]. An information handbook on infertility services. [Washington, D.C.], BCHS, [1983]. 23 p.

622. UNITED STATES. DEPARTMENT OF HEALTH AND HUMAN SERVICES. CENTERS FOR DISEASE CONTROL (CDC). Ectopic pregnancy surveillance. Atlanta, Georgia, CDC, 1982. 20 p.

623. UNITED STATES. DEPARTMENT OF HEALTH AND HUMAN SERVICES. CENTERS FOR DISEASE CONTROL (CDC). STD fact sheet: basic statistics on the sexually transmitted disease problem in the United States. 35th ed. Atlanta, Georgia, 1981. (HHS Pub. No. CDC 81-8195) 35 p.

624. UNITED STATES. DEPARTMENT OF HEALTH AND HUMAN SERVICES. SURGEON GENERAL. Advisory on alcohol and pregnancy. FDA Drug Bulletin 11: 9-10. 1981.

*625. VAESSEN, M. [World Fertility Survey] [Analysis of WFS infecundity and childlessness data] Personal communication, January 4, 1983.

626. VAUGELADE, J. and PROST, A. Influence de l'onchocercose sur la mortalité et la fécondité des populations infectées. [The influence of onchocerciasis on the mortality and fecundity of affected populations.] [FRE] Geneva, World Health Organization, 1982. (WHO/ONCHO/82.161) (Mimeo) 5 p.

627. VENUGOPAL, M.S. and BHASKARAN, C.S. Puerperal and postabortal sepsis: a bacteriological study. Journal of Obstetrics and Gynaecology of India 18(1): 70-78. February 1968.

628. VERHAGEN, A.R.H.B. Gonorrhoea. In: Vogel, L.C., Muller, A.S., Odingo, R.S., Onyango, Z., and Geus, A. De, eds. Health and disease in Kenya. Nairobi, East African Literature Bureau, 1974. p. 375-380.

629. VESSEY, M.P., WRIGHT, N.H., MCPHERSON, K., and WIGGINS, P. Fertility after stopping different methods of contraception. British Medical Journal 1(6108): 265-267. February 4, 1978.

630. VOORHOEVE, A.M., KARS, C., and GINNEKEN, J.K. VAN. Machackos project studies: agents affecting health of mother and child in a rural area of Kenya. Tropical and Geographical Medicine 34(1): 91-101. March 1982.

631. WAGER, G.P., MARTIN, D.H., KOUTSKY, L., ESCHENBACH, D.A., DALING, J.R., CHIANG, W.T., ALEXANDER, E.R., and HOLMES, K.K. Puerperal infectious morbidity: relationship to route of delivery and to antepartum *Chlamydia trachomatis* infection. American Journal of Obstetrics and Gynecology 138(7, Pt. 2): 1028-1033. December 1, 1980.

632. WAGHMARAE, D. Infertility. East African Medical Journal 49(9): 698-702. September 1972.

633. WALL, J.R., WALTERS, B.A., and LESSOF, M.H. Studies of PBL transformation to testis in patients with lepromatous leprosy. In: Boettcher, B., ed. Immunological influence on human fertility. New York, Academic Press, 1977. p. 303-309.

634. WALL, J.R. and WRIGHT, D.J.M. Antibodies against testicular germinal cells in lepromatous leprosy. Clinical and Experimental Immunology 17(1): 51-59. May 1974.

635. WALLACH, E.E. *In vitro* fertilization and embryo transfer in 1982: random thoughts. [Editorial] Fertility and Sterility 38(6): 656-658. December 1982.

636. WALLIN, J. Sexually transmitted diseases: the present situation in Sweden. British Journal of Venereal Diseases 54(1): 24-27. February 1978.

637. WALSH, P.C. Endocrine and chromosomal factors associated with infertility. In: Amelar, R.D., Dubin, L., and Walsh, P.C., eds. Male infertility. Philadelphia, W.B. Saunders, 1977. p. 33-56.

638. WARNER, M.P. Artificial insemination: review after thirty-two years' experience. New York State Journal of Medicine 74(13): 2358-2361. December 1974.

639. WARREN, K.S. [Rockefeller Foundation] [Schistosomiasis and infertility] Personal communication, October 27, 1982.

640. WATSON, R.A. Gonorrhea and acute epididymitis. Military Medicine 144(12): 785-787. December 1979.

641. WEBSTER, B. Professional education and the control of the venereal diseases. Medical Clinics of North America 56(5): 1101-1104. September 1972.

642. WEED, J.C. and HOLLAND, J.B. Endometriosis and infertility: an enigma. Fertility and Sterility 28(2): 135-140. February 1977.

643. WERTHEIN, L.J., ABREU, A., and VALDES-VIVO, P. Problems and approaches in the surveillance and control of sexually transmitted diseases: the Cuban experience. American Journal of Obstetrics and Gynecology 138(7, Pt. 2): 1082-1087. December 1, 1980.

644. WERY-PASKOFF, S., MAERTENS, K., HELSEN, H., and GATTI, F. Contribution à l'étude de la toxoplasmose à Kinshasa. [Contribution to the study of toxoplasmosis in Kinshasa.] [FRE] Annales des Sociétés belges de Médecine tropicale de Parasitologie et de Mycologie humaine et animale 50(6): 703-710. 1970.

645. WEST, K.M. Sierra Leone: practices of untrained TBAs and support for TBA training and utilization. In: Mangay-Maglacas, A. and Pizurki, H., eds. The traditional birth attendant in seven countries: case studies in utilization and training. Geneva, World Health Organization, 1981. p. 71-96.

646. WEST, K.M. Sri Lanka: exploring the use of the TBA as a low-cost means for family health. In: Mangay-Maglacas, A. and Pizurki, H., eds. The traditional birth attendant in seven countries: case studies in utilization and training. Geneva, World Health Organization, 1981. p. 97-130.

*647. WESTRÖM, L. Effect of acute pelvic inflammatory disease on fertility. American Journal of Obstetrics and Gynecology 121(5): 707-713. March 1, 1975.

*648. WESTRÖM, L. Incidence, prevalence, and trends of acute pelvic inflammatory disease and its consequences in industrialized countries. American Journal of Obstetrics and Gynecology 138(7, Pt. 2): 880-892. December 1, 1980.

649. WESTRÖM, L. and MÅRDH, P.-A. Acute salpingitis: aspects on aetiology, diagnosis, and prognosis. In: Danielsson, D., Juhlin, L., and Mårdh, P.-A., eds. Proceedings of the Symposium on Genital Infections and their Complications, Stockholm, October 9-11, 1974. Stockholm, Almqvist and Wiksell, 1975. p. 157-167.

650. WESTRÖM, L. and MÅRDH, P.-A. Genital chlamydial infections in the female. In: Mårdh, P.-A., Holmes, K.K., Oriel, J.D., Piot, P., and Schachter, J., eds. Chlamydial infections. New York, Elsevier Biomedical Press, 1982. p. 121-139.

651. WESTRÖM, L. and MÅRDH, P.-A. Pelvic inflammatory disease: 1. Epidemiology, diagnosis, clinical manifestations and sequelae. Geneva, World Health Organization, 1978. (INT/VDT/78.347) 32 p. (Mimeo)

652. WESTRÖM, L., SVENSSON, L., WØLNER-HANSEN, P., and MÅRDH, P.-A. Chlamydial and gonococcal infections in a defined population of women. Scandinavian Journal of Infectious Disease (Suppl. 32): 157-162. 1982.

653. WHORTON, D., KRAUSS, R.M., MARSHALL, S., and MILBY, T.H. Infertility in male pesticide workers. Lancet 2(8051): 1259-1261. December 17, 1977.

654. WIESNER, P.J. and HOLMES, K.K. Current view of the epidemiology of sexually transmitted diseases in the United States. In: Danielsson, D., Juhlin, L., and Mårdh, P.-A., eds. Proceedings of the Symposium on Genital Infections and their Complications, Stockholm, October 9-11, 1974. Stockholm, Almqvist and Wiksell, 1974. p. 15-24.

655. WIESNER, P.J. and PARRA, W.C. Sexually transmitted diseases: meeting the 1990 objectives — a challenge for the 1980s. Public Health Reports 97(5): 409-416. September-October 1982.

656. WILLCOX, J.R., FISK, P.G., BARROW, J., and BARLOW, D. The need for a chlamydial culture service. British Journal of Venereal Diseases 55(4): 281-283. August 1979.

657. WILLCOX, R.R. "Epidemiological" treatment in venereal diseases other than syphilis. British Journal of Venereal Diseases 49(2): 116-125. April 1973.

*658. WILLCOX, R.R. VD education in developing countries: a comparison with developed countries. British Journal of Venereal Diseases 52(2): 88-93. April 1976.

659. WILLCOX, R.R. Venereal diseases in the islands of the North Pacific. British Journal of Venereal Diseases 56(3): 173-177. June 1980.

660. WILLCOX, R.R. Venereal diseases in the islands of the South Pacific. British Journal of Venereal Diseases 56(4): 204-209. August 1980.

661. WILLCOX, R.R. Venereal diseases in the Pacific islands: Papua New Guinea. British Journal of Venereal Diseases 56(5): 277-281. October 1980.

662. WILLCOX, R.R. A world look at the venereal diseases. Medical Clinics of North America 56(5): 1057-1071. September 1972.

663. WITZLEBEN, C.L. and DRISCOLL, S.G. Possible transplacental transmission of *Herpes simplex* infection. Pediatrics 36(2): 192-199. August 1965.

664. WOLIN, L.H. On the etiology of epididymitis. Journal of Urology 105(4): 531-533. April 1971.

665. WOODRUFF, J.D. and PAUERSTEIN, C.J. The fallopian tube. Baltimore, Williams & Wilkins, 1969. 361 p.

666. WORLD HEALTH ORGANIZATION (WHO). Inter-regional Consultation on Traditional Birth Attendants, Mexico City, December 10-14, 1979. Geneva, WHO, 1980. (HMD/NUR/80.1) 14 p.

667. WORLD HEALTH ORGANIZATION (WHO). Toxoplasmosis: report of a WHO meeting of investigators. Geneva, WHO, 1969. (WHO Technical Report Series No. 431) 31 p.

668. WORLD HEALTH ORGANIZATION (WHO). World health statistics annual: 1980-1981: infectious diseases: cases. Geneva, WHO, 1981. 235 p.

*669. WORLD HEALTH ORGANIZATION (WHO). CONSULTATIVE GROUP ON CURRENT TREATMENTS IN THE CONTROL OF SEXUALLY TRANSMITTED DISEASES. Current treatments in the control of sexually transmitted diseases. (Draft). 1982. 79 p.

670. WORLD HEALTH ORGANIZATION (WHO). EXPERT COMMITTEE ON FILARIASIS. Third report. Geneva, WHO, 1974. (WHO Technical Report Series No. 542) 54 p.

*671. WORLD HEALTH ORGANIZATION (WHO). SCIENTIFIC GROUP ON THE EPIDEMIOLOGY OF INFERTILITY. The epidemiology of infertility. Geneva, WHO, 1975. (Technical Report Series No. 582) 37 p.

672. WORLD HEALTH ORGANIZATION (WHO). SCIENTIFIC GROUP ON *NEISSERIA GONORRHOEAE* AND GONOCOCCAL INFECTIONS. *Neisseria gonorrhoeae* and gonococcal infections. Geneva, WHO, 1978. (Technical Report Series No. 616) 142 p.

*673. WORLD HEALTH ORGANIZATION (WHO). SCIENTIFIC GROUP ON NONGONOCOCCAL URETHRITIS AND OTHER SEXUALLY TRANSMITTED DISEASES OF PUBLIC HEALTH IMPORTANCE. Nongonococcal urethritis and other selected sexually transmitted diseases of public health importance. Geneva, WHO, 1981. (Technical Report Series No. 660) 142 p.

674. WORLD HEALTH ORGANIZATION (WHO). SCIENTIFIC GROUP ON TREPONEMAL INFECTIONS. Treponemal infections. Geneva, WHO, 1982. (Technical Report Series No. 674) 75 p.

675. WORLD HEALTH ORGANIZATION (WHO). SCIENTIFIC WORKING GROUP ON ANTIMICROBIAL RESISTANCE. Antimicrobial resistance. Geneva, WHO, 1981. (WHO/BVI/PHA/ANT/82.1) 28 p. (Unpublished)

676. WRIGHT, J.T., WATERSON, E.J., BARRISON, I.G., TOPLIS, P.J., LEWIS, I.G., GORDON, M.G., MACRAE, K.D., MORRIS, N.F., and MURRAY-LYON, I.M. Alcohol consumption, pregnancy, and low birthweight. Lancet 1(8326): 663-665. March 26, 1983.

677. YANAGIMACHI, R., YANAGIMACHI, H., and ROGERS, B.J. The use of zona-free animal ova as a test-system for the assessment of the fertilizing capacity of human spermatozoa. Biology of Reproduction 15(4): 471-476. November 1976.

678. YARBER, W.L. Venereal disease education and a selected group of American college students. British Journal of Venereal Diseases 53(1): 58-62. February 1977.

679. YARBER, W.L. and BRASHER, D.R. Venereal disease education and a selected group of American teenage females. Sesualita/Sexuality 2(3): 65-79. 1978.

680. ZACKLER, J., ORBACH, H., BROLNITSKY, O., and BROWN, M.C. A mass screening program for the detection of gonorrhea. American Journal of Obstetrics and Gynecology 112(6): 772-776. March 15, 1972.

681. ZINSOU, R.D., QUENNUM, C., and ALIHONOU, E. Role of bilharziasis in female sterility. In: Westin, B. and Wiquist, N., eds. Fertility and sterility: proceedings of the Fifth World Congress, June 16-22, 1966, Stockholm. Amsterdam, Excerpta Medica, 1966. (International Congress Series No. 133) p. 281-283.

ADDENDA

682. ANONYMOUS. Gonococcal pilus vaccine development project by Bactex. Blue Sheet 26(18): 6-7. May 4, 1983.

683. AFRICAN UNION AGAINST THE VENEREAL DISEASES AND THE TREPONEMATOSES. [Recommendations on treatment of gonorrhoea and genital ulcer disease.] [1983] 9 p. (Unpublished)

684. ARAUJO, G. The traditional birth attendant in Brazil. In: Philpott, R.H., ed. Maternity services in the developing world: what the community needs. London, Royal College of Obstetricians and Gynaecologists, 1979. p. 293-310.

685. BISHAW, T., TAFARI, N., ZEWDIE, M., HAILE, D., MASCOLA, L., and BROWN, S. Prevention of congenital syphilis. 1983. 10 p. (Unpublished)

686. CAUSSE, G.Y. [World Health Organization] [β-lactamase producing *N. gonorrhoeae*, global distribution, April 1983] Personal communication, May 10, 1983. 1 p.

687. CENTERS FOR DISEASE CONTROL. Elevated risk of pelvic inflammatory disease among women using the Dalkon Shield. Morbidity and Mortality Weekly Report 32(17): 1-2. May 6, 1983.

688. COOKE, I.D., SULAIMAN, R.A., LENTON, E.A., and PARSONS, R.J. Fertility and infertility statistics: their importance and application. Clinics in Obstetrics and Gynaecology 8(3): 531-548. December 1981.

689. EATON, J.W. and MAYER, A.J. The social biology of very high fertility among the Hutterites: the demography of a unique population. Human Biology 25(3): 206-264. September 1953.

690. ROWE, P.J. and RAHARINOSY-RAMAROZAKA, S.R., eds. Workshop on the diagnosis and treatment of infertility. [Proceedings of the workshop organized by the World Health Organization, Special Programme of Research, Development and Research Training in Human Reproduction in conjunction with the Kenya Obstetrical and Gynaecological Society, Nairobi, February 21-22, 1979] Bath, England, Pittman Press, 1980. 161 p.

691. TIETZE, C. Reproductive span and rate of reproduction among Hutterite women. Fertility and Sterility 8(1): 89-97. 1957.

692. UNITED STATES. DEPARTMENT OF HEALTH AND HUMAN SERVICES. CENTERS FOR DISEASE CONTROL (CDC). Sexually transmitted disease: statistical letter 1980. Atlanta, Georgia, CDC, March 1982. (Issue No. 130) 58 p.

*693. WORLD HEALTH ORGANIZATION (WHO) and PAN AMERICAN HEALTH ORGANIZATION (PAHO). SCIENTIFIC GROUP ON CONTROL OF SEXUALLY TRANSMITTED DISEASES. Control of sexually transmitted diseases. [Report of a meeting, Washington, D.C., April 26-30, 1982] 1983. (In press)

ISSN 0197-5838

CHANGE OF ADDRESS FORM

In the future, please send *Population Reports* to my new address :

Name

Street

City, State, Postal Code

Country

(Attach old label here or write in all information from label.)

RECENT POPULATION REPORTS

ORAL CONTRACEPTIVES—Series A

___ A-5, OCs—Update on Usage, Safety, and Side Effects *(A, F, P, S)*
___ A-6, Oral Contraceptives in the 1980s *(F, P, S)*

INTRAUTERINE DEVICES—Series B

___ B-3, IUDs—Update on Safety, Effectiveness, and Research *(F, P, S)*
___ B-4, IUDs: An Appropriate Choice for Many Women *(F, P, S)*

STERILIZATION, FEMALE—Series C

___ C-8, Reversing Female Sterilization *(F, P, S)*

LAW AND POLICY—Series E

___ E-6, Legal Trends and Issues in Voluntary Sterilization *(F, P, S)*

BARRIER METHODS—Series H

___ H-5, Spermicides—Simplicity and Safety are Major Assets *(F, P, S)*
___ H-6, Update on Condoms—Products, Protection, Promotion

PERIODIC ABSTINENCE—Series I

___ I-3, Periodic Abstinence: How Well Do New Approaches Work? *(F, P, S)*

FAMILY PLANNING PROGRAMS—Series J

___ J-20, Filling Family Planning Gaps *(F, P, S,)*
___ J-21, Social Marketing: Does It Work? *(F, P, S,)*
___ J-22, Traditional Midwives and Family Planning *(F, P, S,)*
___ J-23, Films for Family Planning Programs *(F, P, S,)*
___ J-24, Breast-feeding, Fertility, and Family Planning *(F, P, S,)*
___ J-25, Population and Birth Planning in the People's Republic of China
___ J-26, Sources of Population and Family Planning Assistance

INJECTABLES AND IMPLANTS—Series K

___ K-2, Long-Acting Progestins—Promise and Prospects

ISSUES IN WORLD HEALTH—Series L

___ L-1, Tobacco—Hazards to Health and Human Reproduction *(A, F, P, S)*
___ L-2, Oral Rehydration Therapy for Childhood Diarrhea *(A, F, P, S)*
___ L-3, Community-Based Health and Family Planning
___ L-4, Infertility and STDs: A Public Health Challenge

SPECIAL TOPICS—Series M

___ M-2, Voluntary Sterilization: World's Leading Contraceptive Method *(A, F, P, S)*
___ M-3, The World Fertility Survey—Current Status and Findings *(A, F, P, S)*
___ M-4, Age at Marriage and Fertility *(F, P, S)*
___ M-5, Contraceptive Prevalence Surveys: A New Source of Family Planning Data *(F, P, S)*
___ M-6, Population Education in the Schools

INDEX

___ Index 1972–1977 (to English edition only)
___ Index 1978–1980 (to English edition only)

Population Information Program, The Johns Hopkins University, 624 North Broadway, Baltimore, Maryland 21205, USA

1. Recent **Population Reports** are listed above. Check (✓) the issues you want to order in the spaces provided. **Population Reports** are free in any quantity to developing countries. In USA and other developed countries, multiple copies are $.50 each; full set of reports in print, $20.00; with binder, $25.00. Send payment in US$ with order.
2. All publications appear in English. Many are available in Arabic, French, Portuguese, and Spanish, as the abbreviations after each title indicate. Check the language you prefer: Arabic ☐, English ☐, French ☐, Portuguese ☐, Spanish ☐
3. Please type or print your name and mailing address clearly.

Last name ____________ First name ____________
Organization ____________
Address ____________
City ____________ Postal Code ____________
Country ____________

4. ☐ Send ______ copies of each future issue of **Population Reports.**
☐ I am already on the **Population Reports** mailing list.
☐ Please send me a binder (in developed countries, $5.00 for binder only).
☐ I do not want to receive **Population Reports** regularly.
5. Mail to address above.

POPLINE

POPLINE, a computerized literature search service, offers bibliographic citations and abstracts on any specific subject or field of interest from a collection of more than 100,000 documents covering all aspects of family planning and population. **In developing countries**, searches can be obtained **free of charge** by writing to either of the organizations listed below. **In the United States**, users can subscribe to **POPLINE** through the National Library of Medicine (NLM), Bethesda, MD 20209. **POPLINE** is already available at over 1,800 institutions designated as search centers of the NLM MEDLARS system. **In other developed countries**, searches can be obtained through MEDLARS search centers or, in countries with no access to MEDLARS, through either of the institutions listed below. In developed countries, searches are free to persons employed by international development and training institutions; others may be charged.

POPLINE is produced by the Population Information Program of the Johns Hopkins University, the Library/Information Program of the Center for Population and Family Health of Columbia University, and *Population Index* of Princeton University, in cooperation with the US National Library of Medicine and with financial support from the US Agency for International Development and also from the National Institute of Child Health and Human Development.

To request a search, please complete the following form:

Search topic: ____________
Last name: ____________ First name: ____________
Organization: ____________
Address: ____________
City: ____________ Postal Code: ____________ Country: ____________

Mail this form to either of these addresses →
Services to developing countries free of charge.

Population Information Program
Attn: POPLINE
The Johns Hopkins University
624 North Broadway
Baltimore, Maryland 21205, USA

Center for Population and Family Health
Attn: POPLINE
Columbia University
60 Haven Avenue
New York, New York 10032, USA

11/1/83 U2520 -1.25 A

Population Reports

Series M
Number 7
September-October 1983

SPECIAL TOPICS

Population Information Program, The Johns Hopkins University, Hampton House, 624 North Broadway, Baltimore, Maryland 21205, USA

Migration, Population Growth, and Development

Editors' Summary. In the 30 years between 1950 and 1980, the population of the developing world almost doubled — from 1.7 to 3.3 billion. Among the most conspicuous signs of this increase are the growth of cities and, in some areas, international labor migration. Since 1950 the cities in Africa, Asia, and Latin America have been growing more than twice as fast as those in North America and Europe. Some of the biggest cities are growing fastest — by as much as 8 percent each year. At this rate they will double in less than a decade. About 40 percent of this growth is due to migration and 60 percent to the children born in the cities to natives and the newly arrived migrants. Altogether, about one billion people (1,000 million) now live in developing-country cities, where fewer than 300 million lived in 1950.

About 15 to 20 million workers, mostly from developing countries, are now international migrants. About half travel to Europe and the US, the rest to other developing countries. Many of the migrants, especially to the US, Europe, or the Middle East, want to bring their families eventually and settle permanently. Migration to African destinations is more likely to be temporary or seasonal, while Latin American and Asian patterns are mixed.

Policy makers in developing countries are voicing concern about the highly visible social, economic, and political problems created by rapid urbanization and by large-scale international labor migration. While governments have tried a variety of policies to influence population distribution, most have been limited in scope and had little success. As long as birthrates remain high in some areas and large differences in wages exist between jobs in different places, most of these policies have little hope of stopping or reversing long-term trends. Family planning programs, although they do not create immediate jobs or higher wages in rural areas, can help to reduce the high birthrates that produce an ever-increasing supply of potential migrants. They also directly address the source of 60 percent of urban growth: natural increase.

Economic Motivations

The main reasons for both rural-to-urban and international migration are economic. Except in the case of refugees (not covered in this report), most migrants move because they expect to find better jobs and higher wages in the new location. Often the decision to migrate may be made by the family because the money that migrants send home adds to and diversifies family income. In general, migrants are young (ages 15 to 35), better educated, and more willing to take risks than nonmigrants. Migrants tend to choose the same destinations as previous migrants whom they know and who help them to find jobs. Mass media from the cities and abroad also stimulate migration, while modern transportation reduces travel time and costs.

Migrants usually benefit by their moves and make more money than before, even at unskilled jobs. Fertility drops from the large family size characteristic of rural areas to almost the same level as other urbanites'. Most migrants adapt quickly to a new life, but there is social disruption, which can include postponing marriage or leaving families behind. International migrants tend to make more money but suffer greater social disruption because they usually travel farther and face a different culture and language.

Effects of Migration Mixed

At first, urbanization in developing countries was welcomed as a natural, necessary, and beneficial aspect of modernization. Then visible impacts — crowding, squatter settlements, polluted air and water, and traffic congestion in the cities — raised doubts. Many feared that there were not enough productive jobs in the city for the burgeoning urban workforce. Now economists are again pointing to higher incomes and higher productivity in the cities as signs that urban growth, however painful, means progress. Better schooling, available health care, and

CONTENTS

Population Growth and Expanding Cities M-247
International Labor Migration M-249
Determinants of Migration M-252
Consequences of Migration
for the Individual M-257
Consequences of Rural-to-Urban Migration .. M-260
Consequences of International
Labor Migration M-264
Policies on Internal Migration M-266
Policies on International Migration M-272
Population Distribution and
Population Growth Policies M-276
Bibliography M-278

This issue of Population Reports was prepared by Adrienne Kols, M.A., with the assistance of Dana Lewison, Sc.M., on the basis of published and unpublished materials, correspondence, and interviews. Comments and additional material are welcome.

The assistance of the following reviewers is appreciated: Adrienne Allison, Loy Bilderback, Leon F. Bouvier, Maura Brackett, L.P. Chow, Sarah C. Clark, Larry Ewing, Sally Findley, Jason Finkle, Ronald H. Gray, Scott Grosse, Louis Hellman, Earl Huyck, John F. Kantner, Charles B. Keely, Bun Song Lee, Thomas M. McDevitt, William P. McGreevey, Malcolm Potts, Ahmed Seif El Nasr, J. Joseph Speidel, Oded Stark, and Wilbur Zelinsky. Some reviewers read portions of the manuscript; others, all.

Population Reports is designed to provide an accurate and authoritative overview of important developments in the population field. It does not represent official statements of policy by The Johns Hopkins University or the US Agency for International Development.

Phyllis T. Piotrow, Ph.D., Director; Walter W. Stender, Associate Director; Ward Rinehart, Editor.

Population Reports (USPS 063-150) is published bimonthly (January, March, May, July, September, November) at 624 North Broadway, Baltimore, Maryland 21205, USA, by the Population Information Program of The Johns Hopkins University and is supported by the United States Agency for International Development. Second-class postage paid at Baltimore, Maryland. Postmaster to send address changes to **Population Reports**, Population Information Program, The Johns Hopkins University, 624 North Broadway, Baltimore, Maryland 21205, USA.

smaller families mean more opportunity for the children of migrants. Even with unemployment, underemployment, and exploitation in the cities, both the rich and the poor — and the nation as a whole — may be better off than if the migrants had remained in rural areas, where incomes are even lower and chances for advancement, limited.

Although often resented by the natives, international migrants may take jobs that natives reject and work hard to provide goods and services that might otherwise not be available. The low pay they accept helps to keep prices down. To what extent they actually take jobs from native workers or burden the social welfare system is much debated. Nevertheless, friction over jobs may develop between migrants and other unskilled or minority workers or between different language groups.

For the areas that migrants leave, a major benefit is the remittances that they send back. These remittances provide better food and housing and raise the standard of living in those households. Remittances are also spent for land or conspicuous consumption. More local opportunities for investment would increase the economic benefit of remittances.

Other effects of out-migration and emigration depend on specific conditions. On one hand, the departure of migrants reduces the labor supply and thus theoretically leads to less unemployment and higher rural wages. On the other hand, it adds to the work load of those left behind—especially women—and may lead to shifts in use of land and equipment that benefit some people at the expense of others. In the long run, as long as rural birthrates remain high, rural incomes and especially the incomes of the poorest workers are likely to remain well below urban levels, thus stimulating continued migration.

Government Policies and Programs

Governments concerned that rapid urban growth might slow economic development have attempted various policy measures. Some seek to discourage migration by means of:

- rural development programs to create jobs and make rural life more attractive,
- limitations on urban housing and employment, and
- control of individual movement by passes and permits.

Others seek to divert migration from the largest cities by means of:

- incentives for industry and workers to move to small cities,
- colonization policies to support new rural or frontier settlements, and
- new capital cities.

Most of these efforts require long-term political commitment, considerable funds, administrative efficiency, and sometimes coercion. Results have been mixed, since some projects, such as improving rural education and building roads, may encourage people to move to the cities. Moreover, other national policies, such as high urban minimum wage levels, artificially low food prices in cities, and centralized government administration, stimulate migration to the major cities and usually overwhelm any explicit migration policies to the contrary. Policies to manage and channel rural-to-urban migration in order to maximize its benefits may be more effective than policies to prevent it.

International migration policies have had little more success. Widespread restrictions on immigration have not prevented illegal entries nor kept temporary migrants from settling. There may be as many as 10 million illegal migrants in the US, Western Europe, Venezuela, West Africa, and elsewhere. In times of prosperity international migrants — legal or illegal — are welcomed or tolerated because their labor is needed. In times of recession, however, migrants may be expelled and sent home to countries that have no jobs to offer them. Sending countries usually encourage migration, since the migrants send valuable foreign exchange home — as much as $24 billion (US) in 1978. Labor-exporting countries seek to channel these remittances into investment, to protect their citizens working abroad, and sometimes to repatriate the most skilled emigrants.

Role of Family Planning

While family planning programs have not in the past been considered part of population distribution policies, they can have an important long-term effect. Reductions in urban fertility directly affect the major source of urban growth, while reductions in rural fertility can help ease the pressure for out-migration to the cities or for emigration overseas. As the relationship between population growth policies and population distribution policies becomes more apparent, family planning programs will be recognized not only as a valuable family health measure but also as an essential part of effective population distribution policy.

End of Editors' Summary.

POPULATION GROWTH AND EXPANDING CITIES

World population has increased rapidly in the last three decades. In 1950 there were 2.5 billion people on earth. In 1980 there were 4.4 billion (627, 634) (see Figure 1). Much of this increase has taken place in developing countries, where reductions in death rates have not been accompanied by comparable reductions in birthrates. Between 1950 and 1980, the population of Latin America and Africa more than doubled, while in East Asia and South Asia population almost doubled (627):

	1950	1980
Africa	220 million	470 million
Latin America	164 million	364 million
East Asia	673 million	1,175 million
South Asia	716 million	1,404 million

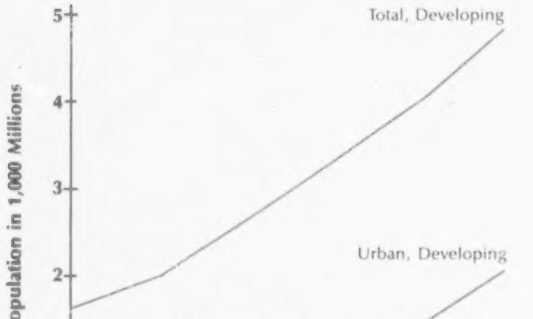
In many developing countries annual rates of population growth exceed 2 percent, so populations double in less than 35 years. Because of some reductions in fertility during the 1970s, the annual rate of world population growth has declined from 1.96 percent in the 1950s and 1960s to 1.70 percent in the early 1980s (627). Nevertheless, with a world population of 4.4 billion people now increasing at 1.70 percent annually, about 75 million people are being added each year. If these rates continue for the next five years, world population will increase by about 375 million, or the equivalent of the current population of all the cities of Africa and Latin America combined (627).

Rapid Urban Growth and Urbanization

One of the most conspicuous features of rapid population change in developing countries and one that has aroused much government concern is the rapid growth of cities (see Table 1). Between 1950 and 1980 urban populations in developing countries grew three and a half times, from 275 to 972 million (see Figure 1). During the 1960s, the fastest growing cities — such as Baghdad, Lagos, and Seoul — grew at rates greater than 7 percent annually (see Table 2), doubling in size in less than 11 years. Such rapid expansion is transforming both the scale of cities and the distribution of large cities between developed and developing countries. In 1950 there were only three cities with more than 10 million people — New York, London, and Tokyo. By the year 2000, if current growth rates continue, there will be 25 of these huge cities in the world, 20 of them in developing countries. The largest, Mexico City, will have almost 30 million people (634) (see Figure 2).

Not only has city size increased rapidly (urban growth), but also the proportion of the population living in cities has increased (urbanization). Urbanites made up 17 percent of total developing-country population in 1950 and 31 percent in 1980. (By comparison, in developed countries 70 percent lived in cities in 1980.) By the year 2000, it is estimated, 43 percent of all people in developing countries will live in urban areas (629). From 1970 to 1975 there was a net transfer of more than 60 million people from rural to urban areas in developing countries (623). In India 4.5 percent of the 1951 rural population — more than 13 million people — had moved to urban areas by 1971 (301).

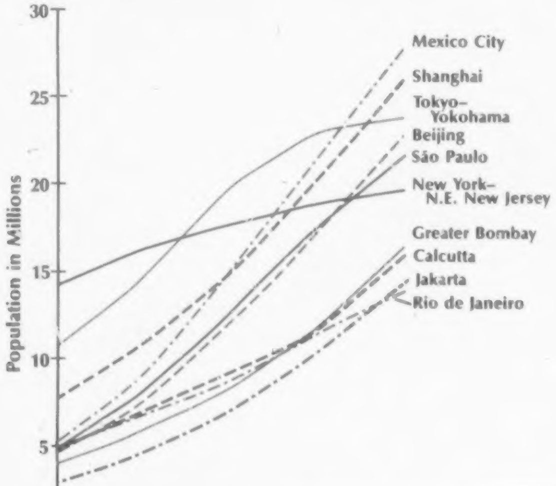
Figure 1. Urban and Total Populations of Developed and Developing Countries, 1950–2000



Source: United Nations (UN). Department of International Economic and Social Affairs. Estimates and projections of urban, rural and city populations, 1950–2025: the 1980 assessment. New York, UN, 1982.

Urban population growth closely parallels total population growth in both developed and developing countries. The cities of developing countries are projected to continue growing rapidly, as is their total population. By comparison, developed-country total population and cities are growing slowly.

Figure 2. Ten Largest Metropolitan Areas in the Year 2000: Population Growth, 1960–2000



Source: United Nations (UN). Department of International Economic and Social Affairs. Estimates and projections of urban, rural and city populations, 1950–2025: the 1980 assessment. New York, UN, 1982.

Cities in developing countries are growing much more rapidly than cities in developed countries. By the year 2000, eight of the 10 largest cities in the world will be in developing countries. Each will have more than 13 million people, and the two largest—Mexico City and Shanghai—will each have more than 25 million.

Table 1. Total Population, Percentage Urban, and Growth Rates of Selected Countries

Region & Country	1980 Population		Average Annual Growth Rates (Percentages) 1975–1980		
	Number (in millions)	% Urban	Total	Urban	Rural
AFRICA					
Ethiopia	31.5	14.5	1.8	6.1	1.2
Kenya	16.5	14.2	4.0	7.3	3.5
Nigeria	77.1	20.4	3.2	5.5	2.7
Senegal	5.6	25.4	2.6	3.5	2.3
South Africa	29.3	49.6	2.8	3.3	2.3
Sudan	18.4	24.8	2.7	6.7	1.6
Zaire	28.3	39.5	2.8	5.3	1.3
ASIA					
Bangladesh	88.2	11.2	2.8	6.7	2.4
China	994.9	25.7	1.4	3.2	0.8
India	684.5	22.2	2.0	3.4	1.6
Indonesia	148.0	20.2	1.7	3.6	1.3
Korea, Rep. of	38.5	54.8	1.7	4.3	−1.0
Pakistan	86.9	28.2	2.8	4.2	2.3
Philippines	49.2	36.2	2.7	3.8	2.1
Sri Lanka	14.8	26.6	1.7	3.7	1.0
Thailand	47.1	14.4	2.3	3.5	2.2
LATIN AMERICA & CARIBBEAN					
Argentina	27.0	82.4	1.3	1.7	−0.8
Brazil	122.3	67.0	2.4	4.0	−0.5
Colombia	25.8	70.2	2.1	3.5	−0.8
Cuba	9.7	65.4	0.8	1.7	−0.6
Guatemala	7.3	38.9	3.0	4.0	2.4
Haiti	5.8	24.9	2.4	4.7	1.7
Mexico	69.8	66.7	3.0	4.1	0.9
Venezuela	15.6	83.3	3.5	4.3	0.1
MIDDLE EAST & NORTH AFRICA					
Algeria	18.9	60.9	3.3	5.8	0.0
Egypt	42.0	45.4	2.6	3.4	1.9
Iran	38.1	49.9	3.0	4.9	1.3
Jordan	3.2	56.3	3.7	4.9	2.2
Morocco	20.3	40.6	3.2	4.8	2.2
Saudi Arabia	9.0	66.9	4.2	6.8	−0.2
Turkey	45.3	47.4	2.5	4.4	0.8
DEVELOPED COUNTRIES					
Australia	14.5	8.8	1.2	1.6	−1.5
France	53.5	77.9	0.3	1.1	−2.2
Japan	116.6	78.3	0.9	1.7	−1.8
United States	223.2	77.0	0.9	1.3	−0.5

Source: United Nations (UN). Department of International Economic and Social Affairs. Estimates and projections of urban, rural and city populations, 1950–2025: the 1980 assessment. New York, UN, 1982.

Table 2. Contributions of Migration and Natural Increase to Urban Growth, and Average Annual Growth Rates, Selected Cities

Region, City & Country	Ref. No.	Years	Average Annual Growth Rate (%)	% Due to Natural Increase	% Due to Net Migration
AFRICA					
Yaoundé, Cameroon	187	1964–69	8.7	38	62
Lagos, Nigeria	147, 409	1963–75	8.6[a]	41	59
Dar es Salaam, Tanzania	65	1967–75	6.8	36	63
ASIA					
Jakarta, Indonesia	640	1971–76	4.0[b]	66	34
Metro Manila, Philippines	465	1960–70	4.1	55[c]	42[c]
Seoul, South Korea	609, 641	1960–70	7.8	22[c]	73[c]
Greater Colombo, Sri Lanka	642, 645	1963–71	2.2	77[d]	23[d]
Taipei, Taiwan	615	1968–73	4.5	49	51
LATIN AMERICA & CARIBBEAN					
Bogotá, Colombia	495	1964–73	5.4	44	56
Port-au-Prince, Haiti	170	1976	6.1	38	62
Mexico City, Mexico	186, 550	1960–70	5.4	57	43
Caracas, Venezuela	63	1966–70[e]	5.3	50	50
MIDDLE EAST & NORTH AFRICA					
Baghdad, Iraq	147, 178	1965–70	7.5[f]	54	46
Amman, Jordan	531	1971	10.5	33	67
Rabat, Morocco	656	1961–71	5.0	48	52
Damascus, Syria	656	1960–70	4.5	64	36
DEVELOPED COUNTRIES					
Paris, France	115	1962–68	NA	59	41
Tokyo, Japan	706	1970–75	NA	70	30
Los Angeles-Long Beach, US	704	1960–70	1.5	75	25

NA = not available

[a] 1960–75

[b] 1970–80

[c] Does not add to 100 percent because some growth was due to reclassification and annexation

[d] Based on 1963 urban classification

[e] Projection

[f] 1960–75

While urban growth is rapid and urbanization proceeds steadily throughout the developing world, there are some important regional differences (see Figure 3, p. M-251). In Latin America and East Asia urban growth rates peaked early, during the 1950s, while they are only now peaking in Africa and South Asia. Urbanization is relatively more advanced in Latin America, which was 65 percent urban in 1980, than in East Asia (33 percent urban), Africa (29 percent urban), and South Asia (25 percent urban) (629, 634).

Cities of different sizes are growing faster in different areas. In Latin America the largest cities — those with more than four million people — are growing fastest. In Africa the small cities — those with fewer than 250,000 people — are growing fastest. The largest and smallest are growing equally fast in East Asia, while cities of intermediate size are leading in South Asia (629).

Migration Versus Natural Increase

There are three components of urban growth:

- migration,
- reclassification of some rural areas to urban, and
- natural increase — the difference between birth and death rates.

In developing countries about 40 percent of all urban growth is caused by in-migration and reclassification, and 60 percent is caused by natural increase of current city dwellers (629). In some of the largest and fastest growing cities of developing countries, however, migration has accounted for up to two-thirds of urban growth (see Table 2). The relative contributions of in-migration and natural increase vary not only from place to place, but also in the same city over time (518).

The distinction between the effects of migration and natural increase may be blurred because, after migrants' arrival in the city, they bear children, who are counted as part of natural increase rather than migration. The Mexico City area, one of the fastest growing in the world, provides a good example. Between 1970 and 1976 an average of over 500 migrants arrived in Mexico City each day. Most were young men and women in their fertile years. They accounted for about 50 percent of the population increase (6, 657). Yet, over about the same period, migrants plus their children accounted for an estimated 74 percent of the total population growth in some outlying parts of Mexico City. In 1970 an estimated 72 percent of all births were to women who had migrated to those areas in the preceding decade (657).

The growth in urban populations of developing countries closely parallels the growth of total population (see Figure 1). A correlation analysis by the Population Division of the United Nations found that urban growth rates in 1,212 cities were more closely related to national rates of population growth than to various national per capita economic indicators. According to this analysis, for every one percent difference in the national rate of population growth, there is a one percent difference in the urban growth rate (484, 629).

INTERNATIONAL LABOR MIGRATION

Compared with internal, rural-to-urban migration, international labor migration is not massive. Estimates of the number of emigrants working abroad include 14 million in 1975 (152) and 20 million in 1980 (635) (see Table 3). In addition, family members may accompany or join workers; in Europe and the Middle East there are as many dependents as workers (76, 662). Almost half of the workers move between developing countries. Most of the remainder migrate from developing countries to developed countries (see map, this page). Despite the relatively small numbers involved, international labor migration has attracted much attention for several reasons:

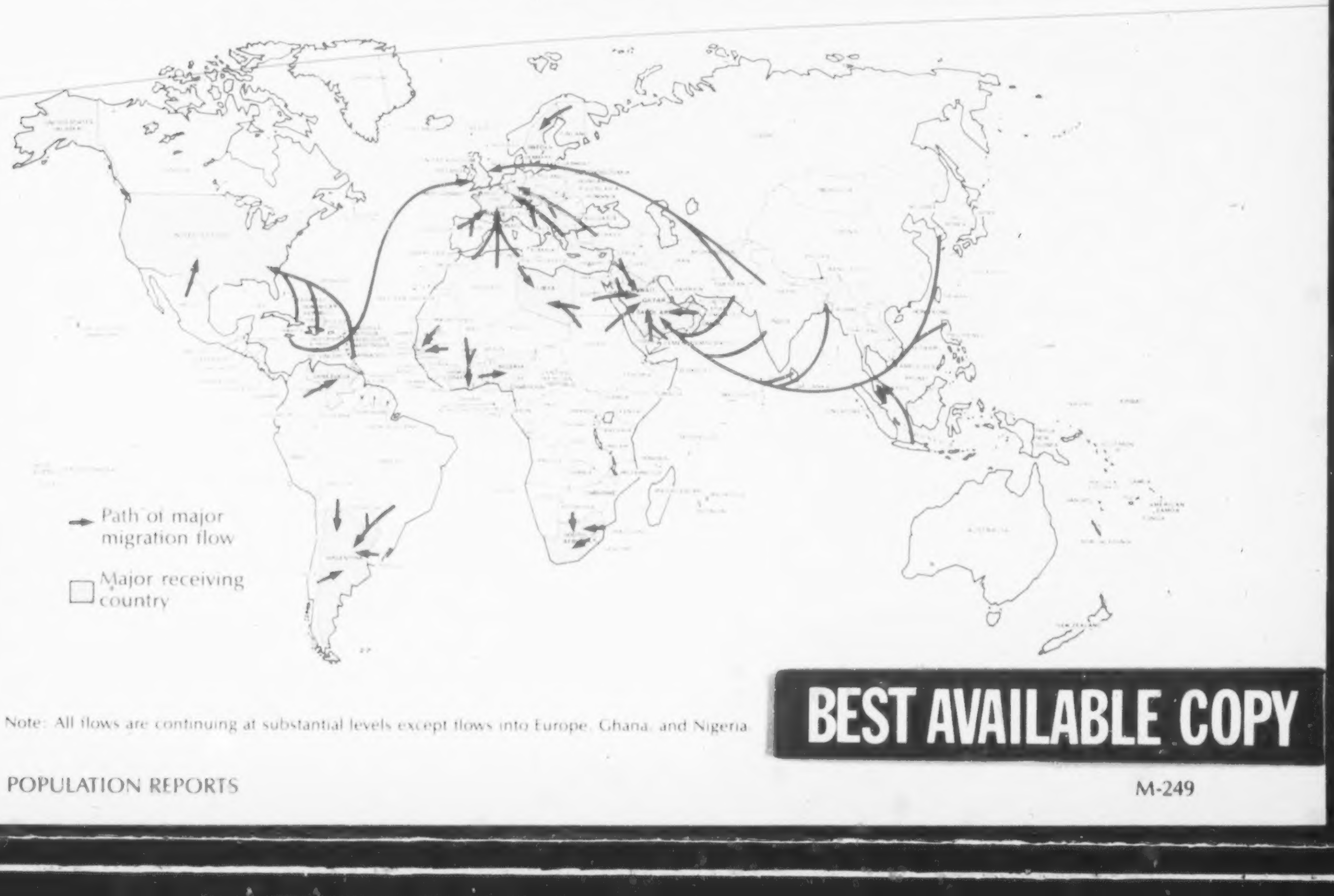
- The numbers in certain areas are substantial; in some Arab oil-producing countries two-thirds or more of the labor force consists of foreign workers, while in some Caribbean countries as many as 50 percent of young males have left at one time or another.
- Where immigrants enter legally, migration is well documented, and so its extent is obvious.
- Illegal migration causes concern because it is uncontrolled.
- Foreigners tend to be resented because of potential economic competition, fear of intermarriage, and cultural differences. These fears may grow in proportion to the number of aliens.

Thus international migration has the potential for creating political problems between the governments of the sending and the receiving nations.

Western Europe

In seven countries of Western Europe, immigrant workers from Southern Europe and North Africa numbered over 5.9 million in 1974 (see Table 3). With their dependents, they numbered over 10 million in 1978 (634). They make up a substantial portion of the total work force in some countries, ranging from 7 percent in France to one-third in

Major International Labor Migration Flows of the Past 20 Years



Note: All flows are continuing at substantial levels except flows into Europe, Ghana, and Nigeria.

BEST AVAILABLE COPY

Studying Migration: Problems of Definitions and Data

The study of migration currently lags behind the study of fertility and mortality for several reasons:

- Definitions are difficult and inconsistent.
- Aggregate statistics derived from censuses, population registers, and border controls rarely contain detailed or accurate migration data.
- Data collected for other purposes, as in housing surveys, provide limited migration information.
- Data collection neglects out-migration and emigration.

Definitions

Birth and death are sharply defined, easily recognized events that happen only once to each individual. Migration is not. The spectrum of human mobility is broad, ranging from permanent emigration to a foreign country, to a move to a nearby city, to a daily commute to work (467). Researchers distinguish migration from other kinds of mobility on the basis of arbitrary standards of duration and distance (213, 576, 621). Duration may be measured in terms of actual or intended length of stay. Minimums range from 24 hours to one year or more (549, 576). Migrants may be classified as **permanent**, **temporary**, or **circulatory** (making repeated short trips from home) (108, 576). Distance is not usually measured directly. Instead it often is defined by the crossing of an administrative or political boundary. Generally, the terms **in-migration** and **out-migration** are used to describe internal migration; **immigration** and **emigration** describe international migration.

Because definitions of migration are both arbitrary and political, migration statistics from different countries or sources are generally not comparable (4, 262, 307, 632). Thus, in 1975 Canada officially recorded 101,564 new immigrants according to national definitions, but by UN standards there were 141,328 (307). As for internal migration, the smaller the administrative unit, the greater is the measured rate of migration (549, 576). Even data from a series of censuses within a country may not be comparable if, as in India, definitions of migration are changed (109).

Statistics on rural-to-urban migration have the additional problem of defining "urban." Depending on the country, urban areas may be defined as places with: (1) a minimum number of inhabitants, ranging from 100 (Uganda) to 2,500 (Mexico) to 10,000 (Malaysia); (2) urban characteristics such as a nonagricultural economy or electricity (as in Zaire and Bangladesh); or (3) a certain administrative status (as in Brazil and Egypt) (629).

Sources of Data

Censuses are the most common source of migration data. Even if the census does not include a direct question about migration, net migration between censuses can be calculated from the differences between population growth and natural increase (47, 621). Many censuses, however, do include one or more direct questions about migration, including place of birth, duration of current residence, and residence at a certain time in the past (6, 549). Each question captures slightly different information and yields different estimates of migration (621, 689). In general, censuses underestimate migration because they collect data on only two or three places of residence for each individual (180) and may miss illegal immigrants (138).

Population registers, which record all changes in residence as they occur, are in theory the best source of migration data. Few countries maintain accurate registers, however, and even fewer tabulate and publish migration statistics based on them (47, 262, 621, 689).

Border statistics provide important information on international migration, since most governments routinely collect some information on foreigners crossing their borders (549, 632). These statistics miss would-be immigrants who pose as tourists or students or who cross the border surreptitiously (262, 632). Also, where workers cross borders often, they may be counted more than once.

Surveys can gather the most detailed information about individual migration histories and socioeconomic characteristics (74, 213, 262). Much research, however, must rely on the limited migration information generated by surveys with some other purpose, such as studying fertility or housing (213). Few surveys collect complete data on migrants before and after the move, and, for comparison, on nonmigrants in places of origin and destination (74).

All four sources of data — censuses, registers, border statistics, and surveys — neglect out-migration and emigration. Censuses count people according to where they *are* at the time of the census rather than where they *were* before, so special tabulations are needed to measure out-migration. For political reasons, population registers and border statistics are far more rigorous in recording immigration than emigration (477, 549). Partly as a result of this problem, the Economic Commission for Europe in 1972 reported 57 percent more immigrants than emigrants among the member countries (632). Even surveys may miss whole emigrant households if no relatives stay behind (74, 213, 262).

Prospects

Some progress is being made toward better data collection and analysis. The International Labor Organisation (ILO), the International Statistical Institute (ISI), the International Union for the Scientific Study of Population (IUSSP), and the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) have been studying migration survey methods (6, 74, 180, 639, 644). The Economic Commission for Europe is planning a regional information system and policy-oriented analysis (84). Many countries have added questions on migration to their census schedules (6, 109), and the United Nations has recommended standardized definitions for categories of international migrants (631). At the same time, advances in computer technology permit more detailed analysis of census data (689). Currently, however, the study of migration relies on fairly weak and incomplete empirical evidence (700).

Table 3. Estimated Number of Foreign Workers and Percentage of Work Force that is Foreign in Major Labor-Receiving Countries and Regions

Labor-Receiving Countries and Regions & Ref. No.	Year	No. of Foreign Workers (in 1,000s)	% of Work Force
Argentina (80, 286, 381)	1974	1,370	14
Ivory Coast (690)	1975	719	25
Middle East[a] (628)	1980	2,800	30
Nigeria (2, 121)	1982	1,000–2,000	3–6
Singapore (42)	1978	100	12
South Africa (2, 600, 626, 670)	1977–83	240–400	3–4
United States (261, 414, 665, 670)	1980	3,000–6,000[b]	3–6
Venezuela (2, 648, 670)	1981–83	1,000–2,000[b]	20–40
Western Europe[c] (623)	1974	5,928	9

[a] Bahrain, Kuwait, Libya, Oman, Qatar, Saudi Arabia, and United Arab Emirates

[b] Ranges are rough estimates because of large volume of illegal immigration.

[c] Austria, Belgium, France, Fed. Rep. of Germany, Netherlands, Sweden, and Switzerland

Luxembourg. Conversely, the emigration of these workers has reduced the work force in some of the Mediterranean countries they left by 4 to 11 percent (628) — not necessarily a harmful effect, since unemployment is high in these countries.

Middle East

The flow of labor immigrants to Western Europe peaked in the early 1970s and then declined. At the same time, higher oil prices stimulated new migration streams in the Middle East. By 1980 there were about 2.7 million immigrant workers in the oil-producing Persian Gulf nations, the largest number of them in Saudi Arabia (76, 628) (see Table 3). At first most of the immigrants came from other Arab countries, but by 1980 almost 30 percent came from Asian countries — chiefly Pakistan and India as well as Malaysia, the Philippines, and South Korea (628). Because many of the Arab countries — both senders and receivers — have relatively small populations, migration has had great demographic and economic impact (628). Some sending countries, such as Jordan, have suffered from shortages of skilled workers, while receiving countries have grown dependent on foreign workers, who make up one-quarter to one-half of the population and an even greater percentage of the labor force (76, 124).

Africa

In sub-Saharan Africa there are two major patterns of international labor migration. One is in West Africa, where in nine countries about 2.8 million people lived outside their country of birth in 1975 (693). Long-distance migration in West Africa has a lengthy history, beginning with the movement of entire villages or clans to avoid war or famine. Later, colonists brought laborers, often by force, to Ghana and the Ivory Coast. Now unequal job opportunities within the region, drought, and the open-border policies of most countries sustain voluntary migration (366, 693). Moreover, with birthrates now above 45 per 1,000 in all West Africa, the number of migrants is likely to grow. Return migration and circulation among countries is common.

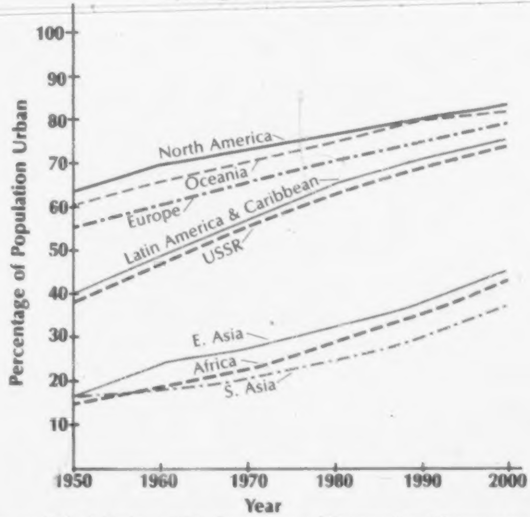
Most of the migrants come from rural areas and the lower-income, land-locked countries such as Upper Volta and Mali. In 1975 as much as 17 percent of the population of Upper Volta was living elsewhere (693). The destinations of the migrants have changed over the last three decades, depending on the relative prosperity of the coastal nations and on their immigration policies. Ghana, the most popular destination in the late 1950s and early 1960s, gave way to the Ivory Coast and Nigeria after the Ghanaian economy deteriorated and, in 1969, the government expelled all aliens without residence permits (693). In 1983 there was a similar expulsion from Nigeria (122, 166).

The other, much smaller labor migration flow in sub-Saharan Africa is into South Africa. For nearly a century mines in South Africa have recruited workers on short-term contracts from neighboring countries. The flow of international migrants amounts to about 250,000 per year, and recently the number has remained fairly constant (628). The origin of the migrants has changed, however, with fewer coming from Malawi and Mozambique and more from Botswana, Lesotho, and Swaziland (158).

Western Hemisphere

In the Western Hemisphere labor migrants, many of them illegal, go chiefly to the US, Argentina, and Venezuela. The US receives more immigrants for permanent settlement than any other country. In the 1970s legal immigrants averaged 425,000 annually, excluding refugees. In addition, there may be some three to six million illegal immigrants currently living in the US (305, 414, 665, 670). Probably half or more of the illegal immigrants — guessed to be 500,000 annually — come from Mexico, with most of the

Figure 3. Percentage of Population that is Urban, by Region, 1950–2000



Source: United Nations (UN). Department of International Economic and Social Affairs. Estimates and projections of urban, rural and city populations, 1950–2025: the 1980 assessment. New York, UN, 1982.

Urbanization is further advanced in some areas of the world than others. Currently Asia and Africa are less than one-third urban, while other regions are about two-thirds urban or more. Latin America is almost as urban as North America and Europe.

remainder coming from other Latin American and Caribbean countries (414).

In Latin America, Argentina and Brazil for many years attracted immigrants from Europe, especially Italy. More recently, particularly between 1960 and 1970, large numbers of immigrants have come to the Buenos Aires area in Argentina from the surrounding countries of Bolivia, Uruguay, Paraguay, and Chile (294).

In Venezuela oil has spurred migration. The majority of the international migrants come from Colombia and work in agriculture, where they replace native Venezuelans who have migrated to Caracas, the capital, or who have gone to work in the oil industry (294). Between 1960 and 1970 there were an estimated one million illegal border crossings into Venezuela, and in the early 1970s perhaps half a million illegal immigrants lived in the country (536).

The small, English-speaking countries of the Caribbean have experienced some of the heaviest emigration in the world. In some cases 50 percent or more of the males born between 1931 and 1945 left the islands between 1950 and 1970. Emigration slowed during the 1970s and many migrants returned, but between 1970 and 1980 net emigration of 10 percent of the 1970 population was typical (72). These emigrants have traditionally gone to developed countries. Recently more movement has been within the region, from countries with poorer economic situations, such as Haiti, to those that are better off, such as the Bahamas and the US Virgin Islands.

Refugees

In 1983 throughout the world 7.8 million international political migrants, or refugees, were awaiting permanent settlement, the majority in and from developing countries (654). In addition there were at least another million people who could be termed internal refugees: they were displaced within their own countries (653, 654). Refugees, in contrast to labor migrants, are fleeing from political, religious, or ethnic persecution or from a sudden crisis such as war (280, 306, 431). Therefore the number of new refugees varies widely from year to year depending on political events. The 1947 partition of India and Pakistan, for example, triggered the movement of 14 million people, one of the largest refugee flows in history (146).

Permanently resolving the fate of refugees is difficult. Sometimes the end of a war or a change in regime allows refugees to return home. For example, 10 million Bengali refugees in India returned in 1972 after Bangladesh became independent (431). When voluntary repatriation is impossible, refugees may find permanent homes either in the country of first asylum or elsewhere (306). From 1975 to 1981 over one million Indochinese refugees were resettled in the United States, Canada, Western European countries, Australia, and other nations (653). These developed countries are not willing or able to accommodate all refugees, however, so many remain in the countries of first asylum. At present these include 2.8 million Afghans in Pakistan, 1.9 million Palestinians in various countries of the Middle East, and 850,000 Ethiopians in Somalia and Sudan (654). For the short term, United Nations agencies and private voluntary organizations help support temporary refugee camps (220). For a long-term solution, when other opportunities are not open, a development-oriented approach, which helps the countries of first asylum integrate some of the refugees permanently into their economies, may be necessary (196, 306, 650).

DETERMINANTS OF MIGRATION

The main reason people migrate is to find better jobs and higher wages, as shown by both economic analyses and surveys of migrants. At the same time, the distance to potential destinations and the quality and quantity of information about them help to shape migration decisions. Migrants tend to be young and better educated, in part because of a desire to establish their independence and in part because young, better educated people can best take advantage of the opportunities offered by migration. In Africa and much of Asia, most migrants are men; in Latin America and parts of East Asia, women predominate.

Jobs and Income

It is now generally thought that migrants move chiefly in search of higher earnings. The economic interpretation of migration developed in the 1960s out of growing concern among policy makers and planners about the relationships among population growth, urbanization, and development (649). In 1964 Simon Kuznets outlined, largely on the basis of US experience, how economic growth and development could lead to migration:

- Technological advances change what people buy and so change the demand for workers in different jobs.
- Employers often choose to locate in cities because they want easy access to raw materials, communication and transportation, and consumer markets. Thus many new jobs are created in cities, even if workers must migrate from the countryside to fill them.
- As industrialization proceeds, a smaller proportion of people work on farms because technological changes in agriculture reduce labor needs. Also, agriculture generally expands more slowly than industry, since, as incomes rise, people spend more of their new income on manufactured goods than on food.
- The natural increase of the population — and so the growth of the labor supply — is higher in rural areas than in urban. Thus migration must "compensate not only for the more rapid growth of demand for labor outside of agriculture but also for the higher rate of natural increase of agricultural labor" (331).

In the early 1960s the "human capital" school of economics cast migration in terms of "an investment increasing the productivity of human resources" (563). In deciding whether to migrate, individuals weigh the costs of this investment against its returns. The costs consist of future earnings at home that the migrant gives up and the expenses of moving, both financial and psychic. The returns consist of the migrant's future earnings in the area of destination (563).

By 1970, extending this view, Michael Todaro and John Harris had proposed that rates of rural-to-urban migration depend on (1) the differences in wages or earnings between areas of destination and origin and (2) the chances of finding a job at the destination (252, 610). Much of the empirical economic research on migration in recent years has sought to test this hypothesis using aggregate data on regions within a developing country. Results have been mixed. The study that tested Todaro's model most thoroughly used data from Tanzania. Its findings supported the model: the rate of rural-to-urban migration was higher where there was a greater difference between rural wages, on one hand, and urban wages multiplied by the probability of finding an urban job, on the other (55). Other studies have similarly linked migration rates with wages as modified by unemployment rates in destination areas (55, 273), with regional differences in wages or earnings (45, 55, 217), or with regional differences in unemployment rates (45).

Most studies, however, have not looked at wage (or income) differentials to explain migration, but rather have studied wages in the destination and origin areas separately. Generally, destination areas with high wages have high in-migration rates (55, 59, 99, 200, 227, 228, 346, 528). In the case of origin areas, however, results are inconsistent: high rates of out-migration are sometimes linked with lower incomes (59, 227, 346, 528, 541) and sometimes with higher incomes (45, 200, 226, 228). Wage levels probably make more difference in stimulating migration than unemployment rates. Generally, lower unemployment levels in destination areas and higher unemployment levels in origin areas are linked with higher migration rates (320, 346), but not always significantly (99, 200, 228, 320).

In a new economic approach, Oded Stark has suggested that the motivation to migrate stems not only from a comparison of wages at the origin and destination, but also from a comparison of personal income with overall village income levels. Below-average earners feel relatively deprived and move in order to increase their incomes. After the move, the migrants continue to measure themselves against the village standard and so feel that they have made an improvement (584).

It could be expected that higher fertility in rural than urban areas — and thus faster growth in labor supply — would contribute to migration. Other things being equal, the more workers, the lower their wages, and thus the greater the difference between rural and urban wages, leading to more migration. This has been confirmed with population data in at least one study. T. Paul Schultz, examining 1951 Colombian data, found that the faster the population grew in a rural area, the faster the young people left. A 10 percent difference in the population growth rate accounted for a 25 percent difference in the out-migration rate among those under age 26, he estimated (541).

Rapid population growth may stimulate rural-to-urban migration even if fertility is the same in both areas. As population grows, productivity is thought to drop faster in rural areas than in urban areas. This is because rural productivity is closely tied to the availability of land, which is limited. The faster drop in rural productivity means that the difference between rural and urban earnings widens, thus accelerating migration to the cities (629).

Evidence on this hypothesis is conflicting. Studies in the Andes, Kenya, Turkey, Pakistan, and the Cook Islands have found higher rates of out-migration from villages or areas with less land per person, but the results of other studies disagree (114, 320). The studies are inconclusive partly because they fail to take into account the effect of past out-migration on current man/land ratios and the varying quality as well as quantity of the land (114). In addition, where land is still plentiful, the relationship between migration and changing man/land ratios would be weak.

Studies of rural villages have noted that there are sometimes two out-migration flows — one to towns and cities, the other to other rural areas (110, 114, 197, 604). Migrants who are richer, better educated, and more ambitious may be more likely to go to the city to school or to find a job. They are more likely to travel longer distances for higher wages. The relatively poor and uneducated tend to go to

Most migrants move because they want to make more money. Even low-level urban factory jobs, such as collating pages at a printing plant in Colombia (left), usually provide higher income than farm work, such as planting groundnuts in Nigeria (right). (World Bank/Y. Hadar, US AID).

nearby rural destinations, often looking for other agricultural work. The very poorest rarely migrate, since they cannot afford to travel or to support themselves while looking for a job (114, 128, 466, 551). The two flows of migrants have been called "pull" migrants and "push" migrants, using the terminology of Everett Lee (343). "Pull" migrants are said to be attracted by opportunities at their destination. "Push" migrants are said to be fleeing poor conditions at home. Some economists are critical of the terms "push" and "pull," however, because they think that wage differentials between areas, not conditions in either area alone, are decisive.

Studies of villages also find that rates of out-migration are higher where land holding is inequitable and a few people own most of the land (114, 168, 666). This may be because inequality creates the social classes most likely to move: failing farmers and landless laborers are pushed out, while the educated sons of better-off farmers are pulled out (114).

Recently, a number of researchers have emphasized the importance of the rural family, rather than the individual migrant, in making migration decisions (114, 133, 249, 583, 585). From the household's point of view, there are two reasons to send one of its members to the city or abroad. Both involve remittances sent back by the migrant: (1) to obtain money needed to invest in agricultural technology and so improve farm earnings and (2) to gain an additional source of income that does not face the same risks as agriculture (421, 492, 582, 583, 586). In the parched Sahel region of Africa, for example, a migrant child is the only

Table 4. Major Reason for Migration Cited by Internal Migrants, by Sex, in Selected Countries, 1966–1982

Region, Country, & Ref. No.	Population	% of Male Migrants Citing Reason				% of Female Migrants Citing Reason			
		Work	Education	Family	Other	Work	Education	Family	Other
AFRICA									
Ghana (20)	328 male and 126 female migrants from Asutsuare area	52	11	28	9	30	4	63	3
Nigeria (165)	545 male and 358 female short-term migrants, mainly to urban areas	54	18	27	—	—	—	100	—
Sierra Leone (94)	3,806 male and 3,347 female migrants to Greater Freetown	48	17	30	5	4	6	86	5
ASIA									
Bangladesh (487)	Migrants into Teknaf thana	72	—	15	12	50	—	36	14
Indonesia (134)	Rural-to-urban migrants in Java	69	20	6	5	47	16	32	5
Korea, Rep. of (281)	214 male and 394 female migrants to Seoul	67	15	9	9	17	11	64	9
Thailand (606)	31,675 male and 36,030 female migrants to Bangkok metropolis	63	17	19	1	50	13	37	1
LATIN AMERICA									
Chile (157)	484 male and 596 female migrants to Greater Santiago between 1942 and 1962	62	10	8	21	56	10	15	19
Costa Rica (64)	91 male and 99 female migrants to San José metropolitan area	47	4	12	36	54	8	12	25
Mexico (279)	48 male and 40 female migrants from a Yucatan village, mainly to urban areas	58	20	23	—	45	5	50	—
Venezuela (111)	Migrants to Caracas between 1958 and 1967	55	11	19	15[a]	26	10	53	11[b]
MIDDLE EAST & NORTH AFRICA									
Algeria (246)	108,889 male and 150,147 female migrants from rural areas between 1966 and 1969	74	3	5	18	1	—	75	24
Egypt (298)	12,020 male and 4,938 female migrants to urban areas	58	23	2	17	5	1	87	8

[a] Includes 5 percent with combined motive of work and family
[b] Includes 3 percent with combined motive of work and family

West African migrants often travel by truck, such as this one which also carries calabashes and hens to market. Modern transportation has made long-distance migration easier. (WHO/P. Pittet)

drought-proof family investment possible (91). In Mexico migration to the US, while risky in itself, produces a large cash income and diversifies the family's income, thus reducing the risks of total dependence on agriculture (512).

In the last several years the study of migration has shifted and broadened its emphasis. Researchers are paying more attention to rural, rather than urban, economic factors as causes of migration. Furthermore, it is clearer that motives for migration, as well as patterns of migration, differ depending on the historical course of development (552, 649). At the same time, the emphasis on using aggregate data to test models of individual decision-making is being questioned. On one hand, sociologists and anthropologists are playing a larger role in migration research, with new emphasis on communities and households (74, 135, 179). On the other hand, some economists are urging more attention to the basic economic structures of a country and particularly to the changing relationships between the agricultural sector, the industrial urban sector, and the informal urban sector where many migrants first find work. These relationships, it is argued, are more readily influenced by government policy than are employment conditions themselves (208, 700).

Migrants' Reasons for Moving

While researchers debate where the emphasis of their analyses should lie, migrants themselves confirm that the search for a better job is an important reason for moving to the city. In surveys of male migrants from over a dozen countries, 55 to 85 percent mention work as the major reason for their moves (see Table 4). A desire for a better education accounts for a substantial minority of the moves. Family reasons — joining or accompanying relatives — also are important. Younger migrants are more likely to move for educational or family reasons, while older migrants more often move to find jobs (509, 519). Urban amenities — entertainment, electricity, and other services — are sometimes mentioned but are not primary reasons (45, 88, 91, 375).

The reasons women give for migrating reveal a different pattern from men's reasons, reflecting social constraints on women's mobility and work (605, 686). In general, work and school are less important and family reasons more important than for men, but there are dramatic variations from one country to another (686). In India, Egypt, Sudan, and Upper Volta, marriage and other family considerations account for over 80 percent of women's moves (120, 298, 439, 479). By contrast, in Thailand, Botswana, Mexico, and Nicaragua, economic reasons are at least as important as family reasons (60, 88, 279, 606). Evidence from Africa suggests that women play down the economic reasons for moving in order to conform to social expectations (686). Wherever large proportions of urban women work — in Latin America, West Africa, and Southeast Asia — economic motives for female migration are probably important (605).

Distance

Many studies show that distance deters migration (91, 128, 163, 505). Analyses of regional data find that distance often accounts for much of the variation in migration rates, sometimes for almost as much as earnings (59, 227, 228, 346, 563). People are more likely to migrate a short distance than a long distance because it costs less and because they know more about opportunities in nearby places (198, 509). This is especially true of low-income and less well-educated migrants (509). In addition, long-distance travel is more difficult for the traveler, and far-away places differ more from home. Thus distance may represent the psychic, nonmonetary costs of migration as well as the monetary costs.

Even for the poorest groups, however, modern transportation has significantly reduced the costs of migration and weakened the deterrent effect of distance. The Frafras of northeastern Ghana who migrated in the 1930s had to walk for two or three weeks to cover the 330 miles to the city of Kumasi. In the 1970s they could travel the 500 miles to Accra in a single day by bus or truck for the relatively small sum of £2 (UK) (253). The availability of transportation has been shown to affect migration patterns in Colombia, Bangladesh, India, Indonesia, and Thailand (110, 128, 378, 569, 619).

International migration often involves the greatest distances and the heaviest costs. Thus international emigrants tend to be better educated, higher-income, older, and have more valuable job skills than internal migrants in the same country (114, 143). In addition to travel costs, the legal barriers to international migration and the assistance required make international migration more difficult (330, 343).

Information

Would-be migrants base their decisions on whatever they can learn about the costs and returns of moving. In developing countries people rely heavily on their relatives and friends living in other places for information about possible destinations (114, 219). Also, gifts and visits from obviously prosperous migrants demonstrate the rewards of life elsewhere (181). Conversely, people are unlikely to move to places that they know little about.

In part because the ties of kinship and friendship channel information and aid, and in part because of a natural attachment to relatives and friends, migrants from the same place of origin tend to move to the same destination (31, 90, 197, 278, 279). This phenomenon is termed chain migration. For example, in the Philippines, migrants from one town have moved to the southwestern part of Mindanao, while migrants from a neighboring town have followed their friends to Manila and the north coast of Mindanao (551). International migrants follow the beaten path in a similar fashion (31, 380).

Chain migration may help to determine the rate as well as the direction of a stream of migrants (701). The rate of inmigration suddenly rises when the size of the settled migrant community reaches a certain threshold. At that point much information flows between the destination and source areas and there is plenty of help for new arrivals, so the psychological barriers to migration weaken (551). Recently, a detailed analysis of rural-to-urban migration in Mexico found that the strongest reason for differing rates of migration to various cities was the different sizes of the migrant communities already there (550).

The mass media may make migration easier and more appealing. They have made villagers aware that conditions are better in the cities and in developed countries (290). A survey of Venezuelan high school students found that radio and newspapers had more influence on residential preferences than either students' own experiences in different cities or family contacts (295). In a Thai study only two socioeconomic variables in the areas of origin were significantly associated with rates of migration to Bangkok — the percentage of households with television sets and the number of trains to Bangkok daily (569).

Who Migrates?

The reasons for migrating, its costs, and its opportunities are reflected in the characteristics of migrants. Thus the tendency to migrate is related to age, sex, education, and ethnic group. Young adults age 15 to 35 are most likely to migrate (15, 17, 64, 120, 157, 214, 279, 313, 439, 620, 642, 688, 691) (see Figure 4). Young adults have fewer personal ties or responsibilities and more years to enjoy the returns from migration (181, 486, 519).

In Africa and much of Asia men predominate in both rural-to-urban and international migration flows, while women marrying often form the majority of short-distance, rural-to-rural migrants (15, 114, 120, 165, 479, 688). Recently, however, more women in Africa and South Asia are joining their husbands in town or independently migrating to cities to find jobs (15, 88, 156, 272, 351, 479).

Rural schools, such as this one in Liberia, teach children the skills needed to get an urban job and so profit from migration. Most migrants are better educated than nonmigrants. (US AID)

Migrants Speak: Migrating for Jobs

Where I come from you just can't make a living, and after a while, we were completely without money. In that situation, you have to leave your family and look for a living wherever you can find it.

—a 40-year-old Mexican migrant to the US (155)

I came to Jakarta in 1970, hoping that in Jakarta I can get a job because, according to my friend who stayed here, in Jakarta everything can be got easy, including money and [a] job.

—a 25-year-old migrant from central Java (679)

On your first trip to the place of the whites, you support those who brought you up. On your second trip, you take out money that counts as cattle for marrying a wife. On your third trip, you look after everything in your own homestead.

—the wife of a migrant in Lesotho (415)

If you are going to France, it's because you don't have any other way of finding work in Mauritania. But if they gave us a way to work in Mauritania, we wouldn't want to leave to work in France.

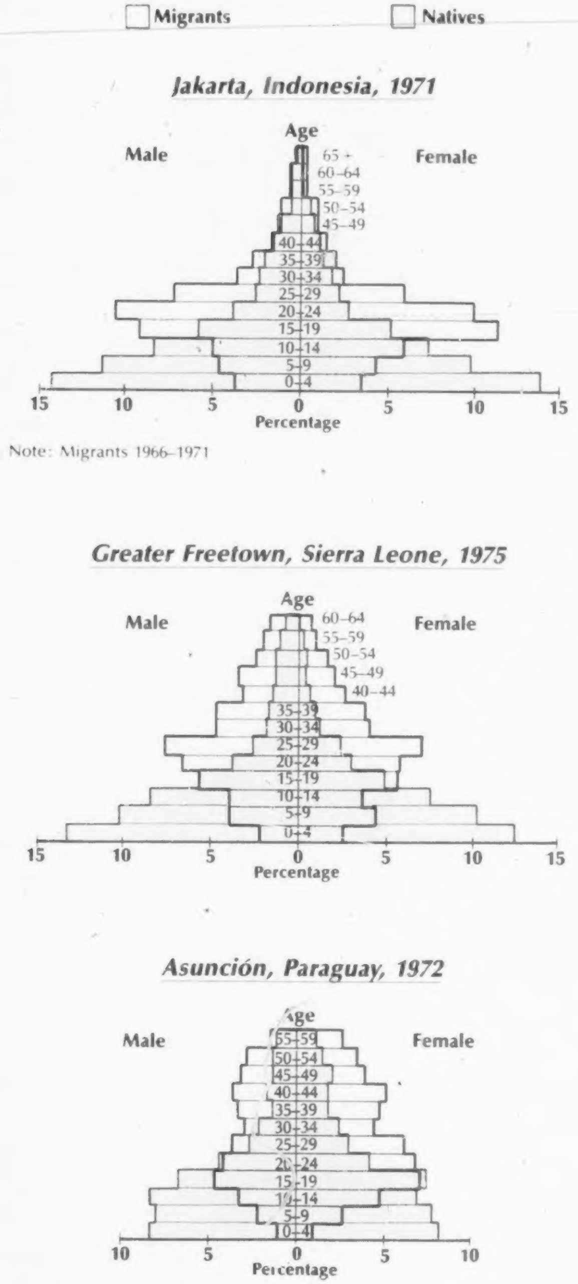
—young Mauritanian waiting to go to France (533)

By contrast, in Latin America and some East Asian countries, such as the Philippines, the majority of rural-to-urban migrants are women (99, 114, 157, 451, 470, 641, 686). They are responding to opportunities for jobs such as domestic service and factory work (44, 164, 291, 451, 566). In rural-to-rural migration in these countries, men looking for agricultural work may predominate. In Chile in 1970 the sex ratio among recent migrants to Santiago was 74 men per 100 women, while among recent migrants to rural areas it was 154 (266).

Rural-to-urban migrants are on average better educated than those who stay behind (17, 163, 181, 279, 439, 603, 688). In a study of 16 north Indian villages, for example, 49 percent of the adult out-migrants had some formal education compared with only 14 percent of other adult villagers of comparable age (114). Better educated people are more aware of outside opportunities and may have learned urban values. They also are likely to benefit more from moving. Schools teach skills that are useful in obtaining urban jobs, and the difference between rural and urban wages is greatest for the better educated (96, 114, 406, 557).

Members of some ethnic groups are more likely to migrate than others (120, 320, 467, 620). Groups with high migration rates include the Serbs in Yugoslavia, the Low Sinhalese in Sri Lanka, and the Kikuyu in Kenya (260, 272, 642). Where migration has been common in the past, young people are aware of opportunities outside the village and have contacts to help them in their move (278). In some cultures, in countries as diverse as Peru, Liberia, and Indonesia, migration is a normal, even mandatory part of a young person's life (114, 278). In contrast, traditional au-

Figure 4. Age and Sex Distribution of Migrant and Native Populations in Three Cities



Sources: Jakarta—Hugo (275); Greater Freetown—Okoye (447); Asunción—Noordam (433).

The age and sex distribution of urban nonmigrants is typical of developing-country populations with high fertility: it forms a pyramid with a broad base, indicating a high proportion of children. By contrast, most migrants are people of working ages, so their distribution is more diamond-shaped. Also, more of the migrants may be of one sex or the other, depending on the city jobs available. In Jakarta, Indonesia, as in much of Asia, men and women migrate in approximately equal numbers. In Africa most migrants are men, as shown in Freetown, Sierra Leone. In the typical Latin American pattern, shown in Asunción, Paraguay, most of the migrants are women.

thorities in other groups, such as the Maasai of Kenya, discourage movement outside the tribe and consider urban material wealth irrelevant to success (272, 278, 368).

CONSEQUENCES OF MIGRATION FOR THE INDIVIDUAL

Most rural-to-urban and international labor migrants benefit from their moves and are satisfied with their new lives. The economic rewards often are greater for international migrants than for rural-to-urban migrants, but so are the cultural changes and the disruption in family life. Migrant communities in the destination area help new migrants adapt to their surroundings, thus easing the transition. For various reasons, the fertility of rural-to-urban migrants tends to be lower than fertility in their rural area of origin.

Social and Economic Adaptation

Most rural-to-urban migrants are glad that they moved (64, 87, 181, 283, 335). They believe that their living conditions have improved (335, 359), that they are making progress (359), and that their children are better off (64, 377). A substantial minority, however, are dissatisfied with city life (181, 313, 375, 655) and may return or move on (314, 363, 688).

Migrants rely on the traditional kinship system and an ethnic identity to help them during the transition to life in the city (145, 359, 575). On arrival, they often live with a relative or close friend who gives them meals, assistance with the job search, information about urban life, and moral support (26, 90, 359, 362, 375, 608). As a result, migrants usually get a job in the same trade as their immediate connections (254, 362) and cluster in neighborhoods with other migrants from their native place (197, 237, 277, 359, 362, 375, 608). These migrant neighborhoods act as a transitional zone between rural and urban environments (16, 282, 359, 377, 474).

Most migrants find jobs quickly and easily because they will accept poorly paid and physically demanding jobs. These jobs typically have a high rate of turnover and are easy to get (277, 297, 364, 516). The unemployment rate among migrants is usually around 5 to 10 percent (64, 157, 161, 439, 516, 655). It decreases the longer migrants remain in the city (88, 99, 439). In fact, unemployment rates often are lower among migrants than among urban natives (64, 157, 257, 323, 360) (see Table 5).

Migrants commonly find their first jobs in the informal sector; that is, they are self-employed or work for small family businesses (323, 361, 559). Typical migrant jobs include street vending, construction, crafts (64, 88, 216, 376, 456, 615, 655), and, for women, domestic service (44, 313, 642) (see Table 5). In most of these jobs the work is intermittent (313, 362, 575), and income varies from one day to the next (456).

While these may be low-level jobs by urban standards, moving increases the income and improves the occupational status of most migrants (99, 106, 323, 397, 443, 456, 615). In Turkey, for example, 76 percent of all urban inmigrants earned more after they moved than before; 12 percent earned the same amount; and only 10 percent earned less (161). Still, migrants tend to earn less than the

BEST AVAILABLE COPY

natives (157, 658), especially at first (277, 439, 516, 615, 658), although when age, sex, education, and occupational skills are accounted for, little difference in wages remains (225, 323, 439, 516, 615). Perhaps because of the relative improvement in their earnings — as well as a rural heritage of political inactivity — migrants have tended to be politically conservative and inactive (103, 117, 118, 141, 426, 489, 678).

For international migrants, the economic improvements may be even greater than for rural-to-urban migrants, since the difference in wages and living standards is often greater between countries than between rural and urban areas of the same country. The adaptation process may be more difficult, however, since the cultural and social gap between home and destination also is wider. Language differences, separation of families, religious and racial discrimination, and an uncertain legal status can make assimilation difficult (237, 270, 394, 524). Temporary migrants may not want to adapt to the new country, and instead they may recreate their native social organization in different surroundings (533).

Fertility

Rural fertility is usually greater than urban fertility, often by a substantial margin (see Table 6). For the most part, the fertility of rural-to-urban migrants falls between rural and urban rates. In some cases, the fertility of migrants is as low as that of native city-dwellers (153, 157, 342, 501, 542, 674, 694, 702).

Three explanations of relatively low migrant fertility have been proposed:

- *Selectivity:* Migrants may be a self-selected group that would have had lower fertility than their rural neighbors even if they had not migrated (210, 342, 501). This could be because willingness to migrate and desire

Table 5. Employment Status of Male Internal Migrants, Selected Studies, 1965–1982

Region, Country, Date & Ref. No.	Population	Unemployment Rate		% of Employed Migrants in Occupational Categories					
		Migrants	Non-migrants	Skilled or Unskilled Labor, Transport	Clerical, Sales	Prof., Tech., Admin.	Service	Farming, Fishing, Mining	Other or Unspecified
AFRICA									
Ghana 1975 (21)	Migrants to urban areas of Accra Capital District	4.7	7.4	47	30	10	9	3	—
Sierra Leone 1981 (448)	Lifetime internal migrants	10	NA	26[a]	11	3	6	43	10
Sudan 1977 (439)	Migrants to Greater Khartoum[b,c]	8	5/3[d]	39	16	5	26	2	11
ASIA									
India 1982 (535)	Migrants from rural areas of districts around Calcutta to urban or other rural areas	8.8	NA	28	9	15[e]	24	21	3
Indonesia 1981 (640)	Interprovincial migrants to Jakarta[f]	6	7	34	—— 45 ——		13	2	6
Korea, Rep. of, 1981 (312)	Migrants to Seoul	4.3	5.2	48	32	6	9	1	4
Sri Lanka 1980 (642)	Migrants to Greater Colombo[f]	7.8[g]	5.4[g]	40	—— 42 ——		13	1	4
Thailand 1981 (258)	Migrants to Bangkok[g,h]	2.2	3.9	48	26	3	11	2	10
LATIN AMERICA									
Chile 1965 (267)	Migrants to Greater Santiago	4.6	7.2	40	—— 28 ——		13	3	16
Colombia 1981 (258)	Migrants to Bogotá[g,h]	9.7	3.9	42	32	6	2	5	14
Mexico 1978 (497)	Migrants from rural villages in Jalisco State to urban areas	12.9[i]	NA	76	—— 9 ——		3	12	—
MIDDLE EAST									
Turkey 1980 (603)	Migrants to metropolitan areas[b]	20.0	20.4	58	17	12	10	3	—

NA = available

[a] Includes miners
[b] Resident less than 5 years
[c] Includes small number of women
[d] Total urban unemployment rate/rate for migrants resident 5 years or more
[e] Includes trader, money lender, rent receiver
[f] Resident 1–4 years
[g] Ages 15–24
[h] In first occupation
[i] Vendor or seeking work

for a small family both reflect a tendency toward more modern, less traditional attitudes.

- *Adaptation:* After they move, migrants may quickly adapt to new surroundings and adopt attitudes and behavior, including lower fertility, that are like those of other urbanites and that suit city life (215, 342, 385, 501).
- *Disruption:* Moving itself may lower fertility by delaying marriages, separating spouses, reducing the desire for an immediate pregnancy, and creating stresses that perhaps disrupt the functioning of the reproductive system (211, 212, 215, 661, 702).

These differing explanations of migrant fertility have different implications for future population growth in developing countries. To the extent that selection is at work, rural-to-urban migration may have little effect on national fertility rates, since the migrants would have had fewer children even if they had never moved. Migration could, however, widen the gap between urban and rural fertility (271, 501). In contrast, adaptation might lower national fertility rates as urbanization takes place (250, 699). For example, Bun Song Lee and colleagues have estimated that in South Korea rural-to-urban migration will avert 2.6 million births among the 1965–75 cohort of migrants (342).

All three factors probably influence migrant fertility, with one or another dominating in particular settings or families (48, 212, 269). A study in Ghana showed the effects of both selection and adaptation. Migrants had lower fertility than rural nonmigrants before they moved, but the migrants' fertility fell still further after they moved and came close to that of urban natives (41). A South Korean study, which also found both adaptation and selection at work, focused on the adaptation effect. The rate of childbearing among rural-to-urban migrants, relative to that among rural nonmigrants, fell after their move. The fertility of migrant women was lower the longer they had lived in the city and the larger the city (342). A similar study in Mexico found that a migrant who spent all her reproductive years in the city would bear 1.45 fewer children than a comparable woman who stayed in the countryside (341). In Mexico most women migrated to the city when young, and the change in their fertility was accounted for almost entirely by a delay in the age at marriage. By contrast, reduced marital fertility also was an important factor in South Korea, where women migrated at a later age (341). In Malaysia birth-spacing patterns showed evidence of disruption as well as selection and adaptation. At every parity level, the interval between births was longer when the mothers had migrated during that interval (212).

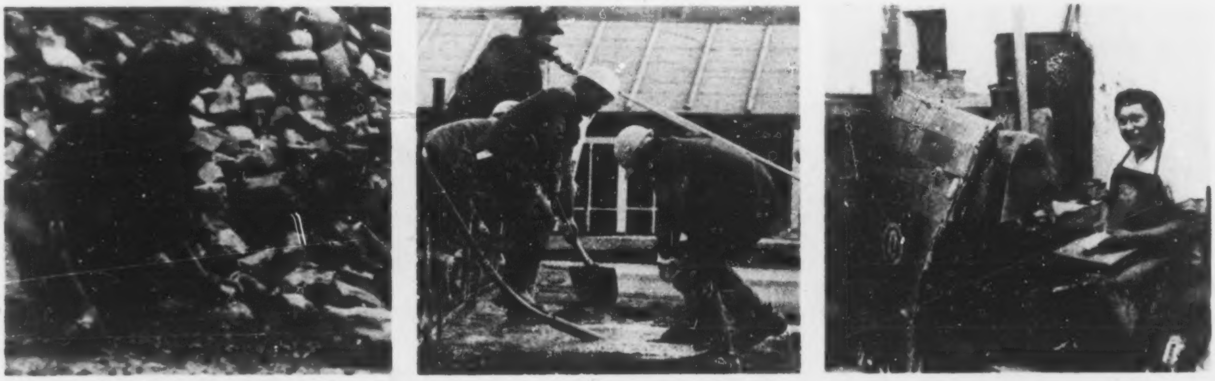
Table 6. Total Fertility Rates by Rural or Urban Residence, Selected Countries, 1971–1978

Region, Country, & Year	Ref. No.	Total Fertility Rate	
		Rural	Urban
AFRICA			
Kenya 1973–78	309	8.4	5.7[a]
Senegal 1978	288	7.5	6.5
Sudan 1978	597	6.4	5.1
ASIA			
Bangladesh 1979	53	6.2[b]	6.1[b]
India 1971–72	651	5.7	4.3
Korea, Rep. of, 1974	322	4.3	2.9
Sri Lanka 1974–75	33	3.9	2.6
Thailand 1978	410	3.8[c]	3.1[c]
LATIN AMERICA & CARIBBEAN			
Brazil 1980	534	5.6	3.4
Colombia 1972–73	475	6.3	3.1[d]
Haiti 1976–77	243	6.9	4.1[e]
Mexico 1978	410	6.5[c]	4.1[c]
MIDDLE EAST & NORTH AFRICA			
Egypt 1975–76[f]	425	6.0	5.0
Jordan 1976	296	9.1	6.5[g]
Turkey 1978	241	5.1	3.7

[a] Nairobi and Mombasa only; rate for other urban areas is 6.8.
[b] Rate for ever-married women
[c] Rate adjusted for possible errors in reported births in the preceding 12 months
[d] Rate for metropolitan areas
[e] Port-au-Prince only
[f] Lower Egypt only
[g] Cities only; rate for towns is 7.0.

Many other studies have tried to evaluate these three factors by comparing migrant fertility with the fertility of urban natives or rural nonmigrants (23, 68, 181, 210, 244, 264, 269, 317, 370, 385, 407, 424, 444, 457, 491, 501, 511). Results are inconclusive, however, because the studies are cross-sectional, and thus cannot examine trends, and because they cannot link individuals' migration and reproductive histories over time (694).

In some areas, especially in Africa, rural-to-urban migration and urbanization have been linked to a short-term



A woman pounding bricks into gravel in Bangladesh, Yugoslavian construction workers in West Germany, and a cobbler in Lima (Peru) illustrate the diversity of migrants' occupations. Migrants typically take low-paying, physically demanding jobs and often are self-employed. Generally they earn more than they did at home. (Steven Smith, ILO, Susan Lobo, *A House of My Own* (359)) rise in fertility rates because of the shorter duration of breastfeeding and postpartum abstinence in urban than in rural areas (93, 173, 422, 521). The evidence on rural-to-urban migrants is scanty. In Jordan, Pakistan, and Thailand, the duration of breastfeeding among migrants was intermediate to that among rural and urban nonmigrants (32, 318, 545). Migrants to Ibadan, Nigeria, practiced postpartum abstinence for 1.2 months less than urban natives (92). By contrast, a study in Lagos, Nigeria, found that neither migrant status nor duration of residence was significant in explaining the length of breastfeeding or postpartum abstinence among city residents. Education was the key factor (345).

There has been little research about what happens to fertility in areas of out-migration. When migration drastically imbalances sex ratios, as has occurred in Barbados, for example, it lowers fertility by reducing the likelihood of marriage (114, 379, 423, 709). When married men migrate, leaving their wives behind, marital fertility also falls because of the lower frequency of coitus (183, 275, 420). In Varanasi, India, the total marital fertility rate for couples separated by migration for 9 to 11 months each year was 6.4, compared with 7.5 for couples who stayed together at home (561). The disruption posed by physical separation may be supplemented by the adoption of more modern ideas, introduced when the migrants return, that favor small families and contraceptive use (183), or by upward social mobility brought about by migration (386). It has been hypothesized, alternatively, that, where migrants are young people who send money home, couples who remained might want more children who could eventually migrate and provide different sources of income (579, 580, 602).

CONSEQUENCES OF RURAL-TO-URBAN MIGRATION

For the individual migrant, the net benefits of migration are considerable. But what are the results in:

- the areas migrants leave?
- the areas where migrants settle?
- the country as a whole?

The consequences for rural areas vary from place to place, depending on the nature of the local economy and the size of the migration stream. Most, however, gain more than they lose from out-migration. Population pressure and unemployment are reduced, while remittances from migrants increase the standard of living. Labor shortages do occur in some areas, and remittances may not be as productively invested as possible, but the situation would undoubtedly have been worse if there had been no out-migration.

The picture is less clear for the cities and the nation as a whole. Is rural-to-urban migration necessary for economic growth? Or is it a cause of increasing unemployment, urban congestion and inefficiency, and an imbalance in national development? The evidence is scanty and inconclusive, but increasingly researchers agree that the answer depends on the specific economic situation and migration patterns of each country (1, 552, 637).

Rural, Sending Areas

For rural areas, the consequences of internal and international migration are similar. They result from the departure of people, mostly young adults of working and child-bearing age, and the influx of money in the form of remittances from the migrants. While the following discussion focuses on the economic consequences of these movements, there are also profound social effects, such as the disruption of family structures.

Population growth. In the long term, out-migration offsets natural increase and so theoretically may slow, stop, or even reverse population growth, depending on how many leave and on their age and sex (310). In practice, high fertility in developing countries today generally overpowers migration, and rural populations continue to grow. Currently, net population losses are unusual even in areas of substantial out-migration, although they have been reported in some rural areas of Latin America and Asia (119, 230). Out-migration has, however, kept rural rates of population growth in developing regions well below rural rates of natural increase (233). (See Table 1, p. M-248.)

Labor force and agricultural production. In the short run, the exodus from rural areas immediately reduces population size and thus the pressure on the land (232, 482, 522). At the same time, it shrinks the labor force and increases the dependency ratio (the number of economically unproductive people for each productive person), since migrants tend to be young adults (35, 98, 275, 412, 692). The economic impact of this movement out of rural areas varies, depending on the number of migrants and the extent of underemployment. Where underemployment is widespread, the absence of up to one-quarter or even one-half of the labor force may not reduce agricultural production (54, 113, 620). In this situation, the productivity of the labor left behind rises, while the productivity of the land remains the same or diminishes slightly.

Even when out-migration creates real labor shortages, many rural families adapt successfully (127, 554). Migrants may regularly return home to help during peak agricultural seasons (144, 158, 277). Women and children may take on more of the agricultural work (105, 238, 277, 686). Remittances from the out-migrants may be used to hire extra labor or purchase machinery and so reduce the need for labor (113, 114, 144, 163, 512). Farmers may switch to less labor-intensive crops (529, 562).

These adaptations, however, do not suit every situation and cannot always prevent a drop in agricultural production (149, 522, 602). Hired labor may be unavailable or too expensive, for example. Thus, in some areas farmland lies idle (434, 452, 522, 602). Because of labor shortages in Oman, less winter wheat is sown; date palms are neglected, so the yield drops; and the irrigation system is poorly maintained, so crops are more vulnerable to drought (76, 562).

When men migrate alone (a pattern typical of Africa and parts of Asia), their wives take on their husbands' farm work in addition to their own and become responsible for managing the household. The women make day-to-day decisions about agricultural and family matters (105, 527, 686). In the long term, continued male out-migration may change the role of women by expanding their activities and responsibilities.

Women work in the fields in Kenya. Labor shortages in agriculture, caused by male out-migration, may mean more work for the women left behind or changes in farm production. (US AID)

Remittances. Migrants everywhere send money home to their immediate relatives and carry back gifts and savings when they return or visit (90, 114, 277). Commonly, as many as 60 to 90 percent of migrants remit money (26, 90, 277, 293, 444). The closer that migrants' ties are to the home community and the more established they are in their work, the more likely they are to send remittances (114, 319, 338, 442, 468, 493, 523). Families at home may support migrants during their difficult early days, and later, once established, the migrants repay their obligation by sending money back to their families (90, 120, 163, 585). At the community level, the net transfer generally favors the area of origin unless many migrants are students supported by their families (98, 163, 493).

Remittances often constitute a large proportion of the migrant's and the recipient's incomes (90, 125, 277, 320, 442, 445). Not surprisingly, such large amounts of money substantially improve the recipients' welfare and standard of living. Diet, clothing, and housing all are upgraded (149, 277, 349, 602). In many communities remittances are the major factor determining which households are more wealthy (36, 176, 356, 372, 415, 560). Remittances can be substantial enough to amount to a major redistribution of income from one geographical area to another. In the late 1960s one-tenth of *all* income earned in Accra, Ghana, flowed out of the city as remittances, savings, and goods — going chiefly to rural Ghana (90).

In most areas the vast majority of remittances and migrant savings are spent on consumption, largely daily living expenses, housing, and other consumer goods (26, 36, 90, 204, 293, 442, 537). According to recipients' reports, a relatively small percentage is directly invested in agriculture, industry, or commerce (57, 184, 330, 493), although remittances may free other income for investment (582). One reason is that many families rely on remittances for basic needs rather than extra income. Another is that remittance income may ease the pressure to invest in order to earn more at home (83, 158, 349, 415, 482, 498). Alternatively, organized opportunities to invest may be lacking (498). For example, in areas of Pakistan, Yemen, and Yugoslavia that are suitable for irrigation or intensified fruit and vegetable farming, remittances are invested in agriculture. In parts of the same countries lacking such investment opportunities, the money is spent on consumption or is hoarded (57, 349, 602). There is evidence for the investment of remittances in agricultural technology in other countries as well, including Kenya and India (421, 441, 492, 580). Another common expenditure of remittances, on schooling (26, 90, 277, 293, 302), is also an investment of sorts — in the labor force.

Innovation by return migrants. The evidence is mixed concerning return migrants as sources of innovation (207, 601). Out-migrants have had more varied experiences and so may be open to or instigate change (114, 120, 277, 365, 389). Thus in the late 1960s Liberian plantation workers used knowledge and seedlings collected on the job to begin raising cash crops on their own farmlands (144). In the Indian Punjab return migrants were more likely to plant high-yielding varieties of wheat, to use tractors and threshers, and to adopt new agricultural practices (441). Return migrants to Nigeria have not only introduced new crops, but also stimulated the building of village schools and health centers (25).

Many out-migrants, however, either do not learn new work skills while away (13, 14, 90, 207, 452), or they have work experience that is irrelevant at home (90, 570). This is especially true of rural-to-urban migrants, who return to farm after holding nonagricultural jobs in the city.

Urban, Receiving Areas and the Nation

The impact of rural-to-urban migration on the cities has received the most attention, largely because of the high visibility of rapid urban growth. In addition, the cities, as the centers of industry and modernization, are presumed to be closely tied to the development of the nation as a whole. Views on the impact of rural-to-urban migration have shifted over the years, and there is still no consensus about whether it is largely beneficial or largely harmful to economic development.

Population growth and the labor force. Rural-to-urban migration increases rates of population growth in the cities (see p. M-248). In-migrants who have children also contribute to natural increase in the cities and, because they are concentrated in the childbearing ages, raise crude birthrates (310). This is especially true where females form the majority of migrants, as is the case in Latin America and parts of Asia (402, 423).

Since most migrants are young adults, immigration generally adds to the number of 15-to-35 year olds in the place of destination (see Figure 4, p. M-257). The result is an in-

Migrants Speak: From the Women Left Behind

The train is sure not our enemy,
Nor is the ship;
Our real enemy is the job
Which has snatched away our husbands.

The field is lying untilled,
The flower in the earthen pot is rotting inside the home,
The wife is rotting in her father's home
And the husband is rotting away in Calcutta.

As the mango trees are blossoming
And Mahua is blooming,
My heart is burning.
Through whom should I send the message?
O cruel dear, why don't you give up your job?

—an Indian song sung by wives about their migrant husbands (537)

In reality I am a widow. For most of my married life (15 years), I have lived apart from my husband. I have to work like a man to feed my family. But that is how it has always been — I do not see it changing.

—the wife of a migrant in Zimbabwe (8)

If you meet him in South Africa, tell him
That I am naked and his mother is naked.

—from a Malawi song describing the poverty of women left at home (79)

crease in the percentage of the population active in the labor force, a decrease in the dependency ratio, and perhaps even a decrease in the overall mortality rate (160, 312, 354, 657). If migrants settle, however, their impact on the age structure changes over time. Single migrants marry and have children; married migrants are joined by their spouses and children who had been left at home; and all the migrants age (75).

Economic growth and development. Decades of debate have failed to conclude whether rural-to-urban migration aids or impedes development in present-day developing countries and their cities. The relationship among urbanization, industrialization, and development is complicated, and conclusive empirical evidence is scarce. Initially, based on the experience of Europe and North America, economists viewed migration as a relatively smooth geographical reallocation of labor in response to economic growth (see p. M-252) and so saw urbanization as a natural and beneficial part of development (267, 331, 347, 488, 429). This shift of workers made labor more productive, thus raising incomes and the national product. Furthermore, migration was seen as self-limiting, since the shift of workers from the countryside to the city would eventually eliminate the geographical difference in wages that had inspired migration in the first place (331, 398, 399).

This position soon had its critics. They argued that the developing countries were not following the pattern of Europe and North America. Urbanization was taking place faster than urban economic growth could create jobs for the migrants (192, 234, 235, 391, 609, 673). One fundamental problem, it has been thought, is political bias in favor of urban areas — public policy and government spending that maintain an artificially wide urban-rural difference in wages and living standards (234, 357, 612). Another cause is rapid population growth, which is creating potential workers faster than in Europe and North America when those areas were developing. At the same time, industry is more mechanized, less labor-intensive, and thus requires fewer workers (192, 552). Furthermore, migration can be expected to continue even in the face of high urban unemployment, because the extremely wide difference between rural and urban wage levels makes it appear worthwhile for migrants to take a chance on getting a city job (252, 609). The migrants to the city, it is argued, end up unemployed or in unproductive informal-sector jobs. Instead of contributing to national economic growth, their presence merely depresses wages and permits economic exploitation (97, 234, 391).

This "overurbanization" is complicated by a distortion in the size distribution of the cities within a country, so that the biggest, or primate, city is disproportionately large (67, 393). These cities absorb more than their share of resources and create a less than optimally efficient economic distribution of the factors of production (396, 502, 673, 675). Many of these primate cities are thought to be growing beyond the "optimal city size," that is, so large that business operations and the provision of services are becoming less efficient and more costly (235, 440, 502, 673, 678). This negative view of urbanization colored the World Population Plan of Action adopted at Bucharest in 1974, which stated:

> Urbanization in most countries is characterized by a number of adverse factors: drain from rural areas through migration of individuals who cannot be absorbed by productive employment in urban areas, serious disequilibrium in the growth of urban centres, contamination of the environment, inadequate housing and services and social and psychological stress. (682)

Many economists are now criticizing these negative views and taking a more positive attitude toward migration. Merely because current migration is not following exactly the same patterns followed by Europe and the US does not mean that it is not a valuable part of the development process (209, 572, 669, 673). In addition, they argue that migration does not cause substantial unemployment, since the informal sector in the cities does provide jobs (see p. M-257) and does contribute to economic growth (257, 335, 377, 642). Furthermore, economists have shown that primate cities can be efficient in certain economic

This squatter settlement in Manila has expanded out over the water. Large cities in developing countries are surrounded by squatter settlements because there is not enough cheap housing for the large numbers of in-migrants. (US AID) settings (396, 495, 546) and have pointed out the lack of evidence for diseconomies of scale or, indeed, for any one "optimal city size" (38, 400, 404, 503).

As a result, recent views have been shifting back to the idea that rural-to-urban migration and urbanization are, on balance, ultimately beneficial, self-regulating parts of development. This swing back to older arguments is accompanied, however, by a new realization that the relationship between urbanization and development is complex and probably varies from one setting to another (358, 637). In addition, current thought recognizes that urbanization, while beneficial in the long term, may cause problems in the short term. Thus,

> In one sense, the problems of urban growth and urbanization are necessary costs that accompany development and modernization. These costs may be high and, in developing nations, higher than ever before in modern history. Nevertheless, the rapid rate at which developing nations are entering the process of social and economic development cannot be expected to occur without conspicuous social and economic strains and tensions. The transformation of societies and persons toward greater urban concentration and urban life is a revolution in social structure and processes. Even silent revolutions have disorganizing implications as part of societal and personal readjustment and realignment. (209)

Income distribution. It is increasingly argued that greater equity in the distribution of income ought to be used as a measure of a nation's welfare instead of or along with the traditional criterion of economic growth. Opinions conflict concerning whether rural-to-urban migration makes the distribution of income more or less equitable. Macroeconomic models have generally concluded that rural-to-urban migration tends to equalize incomes (22, 30, 516). By contrast, a review of village-level studies by Michael Lipton has concluded that rural out-migration increases economic inequality between the city and the countryside, among rural villages, and among individuals in the same village (356). Major issues being debated include whether remittances redistribute wealth more equitably, whether migration provides lower-income groups with better access to highly paid industrial jobs, whether reduced rural population pressure improves rural incomes, and whether a change in the relative supply of urban and rural goods favors farmers (22, 30, 356, 357, 516). Opinions on these issues often depend largely on theoretical economic assumptions (516), interpretations of statistical measures of inequality, and whether the individual or the family is the unit of analysis (587). In fact, the effect of migration on income distribution, like its effect on economic growth, probably varies from one time and place to the next, depending on the specific economic setting and the patterns of migration (516).

Public services and housing. Rapid city growth, due partly to in-migration and partly to urban natural increase, is difficult to control or accommodate, straining the ability of cities to provide public services (63, 95, 202, 205, 376, 408, 449, 672). Urban areas spend more than rural areas on housing, garbage collection, sewerage, water, transportation, and even education. In part, this is because higher urban labor costs and other costs offset the economies of scale and ease of collection and distribution that are characteristic of cities. In part, large cities need a greater number of public services and more expensive types of service. Cities require piped water and sewerage, organized garbage collection, and police and fire protection, which rural areas often do without. Also, services must be provided to industry, and the city dwellers demand more and higher-quality services (234, 355).

Men wash on the sidewalk in Calcutta. Rapidly growing populations make it hard for cities to provide basic services such as running water, sewerage, and electricity. (US AID)

Because of the financial burden, large parts of some cities in developing countries, especially the squatter sections of the cities, still lack electricity, running water, sewer systems, and garbage collection (63, 95, 97, 408, 409, 453, 658). Water sources are often contaminated by sewage and garbage, creating a major public health problem (43, 408, 409, 514, 575). Public transportation also may be inadequate for the growing number of passengers (202, 453, 658).

In housing, the most visible sector, construction cannot keep up with demand (140, 202, 417). In Bangkok, for example, 50,000 to 60,000 new housing units are built each year, but 120,000 are needed (453). Even where homes are available, they are usually too expensive for migrants and even for many well-established city dwellers (408, 618). Migrants cope with the housing problem by illegally squatting on vacant public and private land and building their own dwellings from whatever materials are at hand (116, 147, 377, 618). In most large cities in developing countries more than one-quarter of the population are squatters. In some, including Kinshasa (Zaire), Colombo (Sri Lanka), and Cartagena (Colombia), the squatters make up 50 to 70 percent of the populace (147). For the most part, however, squatters are not new arrivals to the city, but migrants who have already lived for some time in central city slums or city natives who cannot afford more conventional housing (408, 618). Although the squatter settlements appear to be chaotic, disorganized, and chronically impoverished, the community within them may be functioning well and making great efforts to improve conditions. Once land tenure is secure, the squatters rebuild their shacks into permanent houses and try to obtain basic services (147, 300, 335, 359, 377, 618). Squatters may make substantial investments in housing. In one squatter settlement in Manila, for example, the average house was worth almost $1,900 (US) relative to an average annual income of $982 (292).

CONSEQUENCES OF INTERNATIONAL LABOR MIGRATION

International labor migration, like internal migration, involves flows of labor in one direction and flows of money in the opposite direction. In the country that people leave, the immediate decrease in the size of the labor force often improves the employment situation overall, although it may create some labor shortages and thus induce internal migration or immigration. Likewise, remittances, although inflationary, provide the country of emigration with a source of income, foreign exchange, and potential investment. In the countries receiving migrants the flow of labor contributes to the economy by providing extra or inexpensive labor, although the overall effect on the economy is difficult to measure. When large numbers of "temporary" workers settle permanently, however, as they often do, they may create social, political, and demographic problems.

Sending Countries

Labor force and employment. Many developing countries have welcomed international emigration as a quick cure for high rates of unemployment and underemployment (151, 526). Emigration reduces the competition for jobs at home, and the remittances sent back by the emigrants create new jobs (450). In Jordan and Greece emigration has in fact eliminated almost all unemployment (316, 454). Emigration from the Maghreb to France from 1970 to 1973 cut in half the number of new jobs needed to keep up with population growth and avoid increases in unemployment in North Africa (450).

Migrants Speak: Experience in Europe

I think the Portuguese are better off in France. I find you can't save any money in France, but you can have [a] better standard of living; in Portugal we used to go for months without eating meat but in France we eat it two or three times a week. . . .

—41-year-old Portuguese woman in France for two years (237)

We've been here for 14 years now and I've been through just about everything . . . . I was 25 when I came; I was different then and I expected things to be different . . . . I can't imagine the future . . . . We don't like the idea of staying here, but we've got to . . . . Our children are like foreigners when we go back to Greece. They're foreigners there and here, and so are we.

—A 39-year-old Greek woman (237)

If we go home to Portugal it will be more difficult to adapt to life there because the standard of living is better here. The girls don't want us to go back to Portugal. My husband wants to. My husband says he doesn't like living here because he can't speak — he's often fed up — and he has nothing to do on Sundays. With the money we save here, we'd like to build a little house; just one story, to live in when we're old in Portugal.

—53-year-old Portuguese woman in France for several years (237)

Emigration may create shortages of skilled workers, however (36, 382, 455, 471, 538). The emigration of professionals, dubbed the "brain drain," has received much attention (206, 430), but emigration has also caused labor shortages in less skilled fields, such as construction and public utilities, that impede economic development in countries such as Bangladesh, Greece, and Yugoslavia (36, 57, 83, 455).

In some countries the labor shortages created by emigration are reduced by importing other workers. Thus, Indonesians work at agriculture and construction jobs in Malaysia to replace Malaysian workers who have migrated to Singapore and the Middle East (353). Seasonal migrants from Mali work in the millet fields of Mauritania to replace emigrants to France (149). Jordan is the most conspicuous example of this replacement migration. The migration of skilled and semiskilled Jordanian workers to Saudi Arabia and Kuwait has opened up many jobs in the cities and provoked internal, rural-to-urban migration to fill them. Also, Egyptians, Syrians, and Pakistanis enter Jordan in large numbers to fill the jobs of the urban emigrants, the jobs of rural out-migrants, and the new jobs created by remittances flowing into the country (316, 562).

Large-scale, sustained emigration may slow population growth and hence the growth of the labor force (709). For example, emigration has reduced population growth by 25 percent in Upper Volta (692) and by 29 percent in Samoa (380). The emigration must be permanent, however, to produce major long-term effects. What is more, to counteract very high fertility, the flow of emigration would have to be enormous. Nathan Keyfitz has calculated that, to reduce a 3 percent growth rate to zero in a high-fertility setting, 57 percent of all 15-year-olds would have to leave each year (310).

Remittances. International migrants send remittances home, just as internal migrants do (see p. M-261), except that the sums are larger because their wages are higher (114, 493). The money is mostly spent on consumption, and it greatly improves the material welfare of the recipients. Because of the large sums involved, international remittances have become the main source of household income in countries such as Lesotho and Montserrat, where emigration has become a way of life (415, 468). The Rif region of northern Morocco is an extreme case: in the early 1970s 38 percent of households were supported entirely by remittances (176). In Bangladesh in 1979 and Pakistan in 1979–80 remittances from emigrants to the Middle East formed, on average, three-quarters of the recipients' incomes (36, 204).

In 1978 all international remittances amounted to an estimated $24 billion (US) (600). The foreign exchange generated by these remittances may contribute significantly to national economies, helping to overcome a major obstacle to economic expansion and development (574). In Upper

Volta, Jordan, and the Yemen Arab Republic, for example, international remittances cover the cost of more than one-third of all imports and are equal to more than 10 percent of the gross national product (see Table 7).

The large sums saved by international migrants allow many of them to set up small businesses when they return home. Opening a shop or cafe is popular, as is buying a taxi or truck, since the return migrants prefer to be self-employed (57, 149, 207, 380, 543, 602). Workers from one small Mexican town migrated to the US for short stays and accumulated the capital to establish small textile factories (142).

Even if remittances are not directly invested in production, they contribute to the economy. Remittances spent on housing can create jobs in construction (207, 311). Expenditures on consumer goods — if they are not imports — can stimulate other domestic industries (149, 151, 455, 574). Even expenditures on basics such as food contribute, aiding small businesses and farming (450).

Remittances may indirectly cause inflation (81, 570). Prices may rise steeply in response to the demand for goods that is generated by remittances (455, 466, 478, 498). The poorest families suffer most from rising costs, because they are least likely to have a migrant relative remitting money. At the same time, the shrinking size of the labor force may push up wages (415, 526).

Return migration. Emigrants carry back new values and work habits from their stay abroad, but they rarely learn specific skills that are useful on their return (13, 14, 90, 207, 452, 570). Migrants who worked in European factories return to North African countries with few factories (382, 455), while Mexicans who picked fruit on US farms go back to cereal agriculture (207). Return migrants thus may serve as agents of change, but they are not necessarily a skilled workforce.

Costs and benefits. The costs and benefits of emigration depend on the characteristics of the migration and on the economy of the labor-exporting country (316, 452, 573). For example, the adverse effects of emigration to oil-producing countries have been less in Jordan than in Egypt because of the differing natures of their domestic labor markets. The flexibility of the Jordanian labor market has allowed those who remain to move up into the jobs vacated by the emigrants. In contrast, the lack of upward mobility in the highly segmented Egyptian labor market has aggravated the labor shortage and wage inflation caused by emigration (76).

Quantitative cost-benefit studies have concluded that in Bangladesh and Pakistan the benefits of remittances and reduced unemployment outweigh the costs of foregone production (36, 204). A similar study of Egypt concluded that migration was definitely beneficial from the perspective of human welfare, although its contribution to economic growth was uncertain (242).

The long-term problem may be economic dependence on international labor migration, which is inherently unstable (14, 316, 382, 452, 522, 601). During the 1973–74 recession major European labor-importers suddenly cut off migration. Emigrants from Morocco and Tunisia found alternative destinations in the Middle East (77, 176), but Turkey was left with a $2.9 billion (US) debt because remittances, expected to finance an ambitious development plan, failed to materialize (382).

Table 7. Inflows of International Remittances, Selected Countries, 1975–1977

Region & Recipient Country	Ref. No.	Year	Amount (millions US$)	Remittances as Percentage of:	
				Imports*	GNP
AFRICA					
Benin	600	1976	17	9.5	3.1
Botswana	600	1975	10	4.8	3.3
Lesotho	600	1977	32	NA	9.9
Malawi	600	1976	5	2.5	0.5
Mali	600, 692	1977	27	23.2	3.9
Sudan	203, 600	1977	40	6.3	0.7
Upper Volta	600, 692	1976	67	39.7	10.9
ASIA					
Bangladesh	600	1977	78	10.0	1.3
India	600	1976	645	14.0	0.7
Korea, Rep. of	600	1977	103	1.0	0.3
Pakistan	600	1977	866	34.8	5.7
Philippines	203	1977	130	3.3	0.6
Sri Lanka	203	1977	12	1.9	0.5
LATIN AMERICA & CARIBBEAN					
Bolivia	600	1977	1	0.2	0.0
Colombia	600	1977	82	4.1	0.4
El Salvador	600	1977	10	1.2	0.5
Jamaica	600	1977	41	6.1	1.3
Mexico	600	1977	251	4.8	0.3
Paraguay	600	1975	1	0.5	0.1
MIDDLE EAST & NORTH AFRICA					
Algeria	600	1977	388	6.3	2.0
Cyprus	600	1977	51	9.1	4.5
Egypt	600	1977	897	21.8	6.7
Jordan	600	1977	455	37.2	23.4
Morocco	600	1977	588	20.9	5.5
Oman	548	1975	104	29.9	6.2
Syria	600	1977	92	3.9	1.4
Tunisia	600	1977	168	10.5	3.4
Turkey	600	1977	991	19.2	2.1
Yemen Arab Rep.	600	1977	1,157	160.7	45.7
Yemen P.D.R.	600	1977	177	NA	32.1

Note: Percentage of imports and GNP calculated by Population Information Program based on: World Bank. World tables, the second edition [1980], from the data files of the World Bank. Baltimore, Johns Hopkins University Press, 1980.

GNP = gross national product
NA = not available

*Merchandise only

Receiving Countries

The effects of migration on receiving countries are difficult to measure. Some countries have welcomed workers from abroad as an inexpensive, supplementary labor pool. In the Middle East, in particular, outside workers have been necessary because the native labor force was too small to implement far-reaching economic development programs funded by oil revenues (76). Even where there is no absolute labor shortage, immigrant workers may accept poorly paid, menial jobs with little security that are unattractive to native workers (469). Exactly how much these foreign workers contribute to the economy is unclear, however, and probably varies with time and place. In theory, their presence may hold down wages and inflation, allow economic expansion, and avoid expensive mechanization and job reallocation (27, 382, 394, 454, 472). Depending on the economy of the receiving country, however, negative impacts may be more important. The immigrants might take jobs away from the most disadvantaged native workers — minorities, teenagers, and women — and depress their wages; or postpone needed economic changes and so aggravate structural economic problems; or drain the economy by sending large amounts of money home (248, 436, 454, 472).

Receiving countries assumed that foreign workers would add flexibility to their economies by coming and going in response to economic cycles and to labor shortages and surpluses in specific industries (382, 394, 472). In practice, foreign workers have *not* been an easily controlled or flexible labor pool. Illegal migration has thwarted government attempts to control the number of migrants (76). More importantly, the migrants — legal or illegal — do not return home quickly in times of recession, as expected by governments. Instead, in Europe and North America migrants have gradually brought their dependents to join them and have settled permanently (382, 395, 411). Migrants in the Middle East also are beginning to set down roots (76, 670). The permanent settlement of migrant families has sparked demands for health services, education, welfare and unemployment benefits, and conventional housing rather than dormitories (248, 382, 395, 411, 436, 659). Social and political problems are often magnified by natives' resentment of the outsiders (270, 671).

The demographic impact of migration also is a matter of concern to receiving countries, especially if immigrants settle permanently. Immigration can increase population growth, as it has done in the Ivory Coast and Gambia (693), or offset natural decrease among the native population, as it has done in West Germany (162, 303). In addition, the fertility of immigrants may influence the rate of natural increase. Because immigrants are concentrated in childbearing ages and may have higher fertility than the natives, immigrants often produce a disproportionate share of the next generation (414). Thus immigrants formed 8.5 percent of the Belgian population in 1975 but contributed 16.8 percent of the births in that year (676).

The visibility of poverty in squatter settlements, like this one in Hong Kong, arouses government concern over rural-to-urban migration and its impact on economic development. (US AID)

Migrants — internal as well as international — may pose special health problems to the areas receiving them. They may spread infectious diseases from the area of origin to the area of destination. In addition, the act of migrating itself stresses the migrants mentally and physically, since they must adapt to a new environment, life style, and possibly socioeconomic status (668). They may face new occupational hazards or life in a crowded squatter settlement with poor sanitation (43, 514). At the same time, migration changes their access to health services. While services often are more abundant in urban areas and developed countries, cultural and language barriers may cut migrants off from them (668).

POLICIES ON INTERNAL MIGRATION

The majority of developing-country governments are concerned about the economic and political repercussions of internal migration. They have implemented a wide variety of explicit policies—

- to slow rural-to-urban migration, by encouraging rural development and creating urban barriers to migration, or
- to divert internal migrants away from the largest cities to other destinations, including small cities and frontier areas (638).

In addition, some governments have tried to accommodate existing migrants by providing better housing and more jobs in the city.

Explicit population distribution policies have been costly and have had little success because of the contradictory impact of other national development plans, lack of political support, and limited understanding of specific migration trends and causes. To succeed, a population distribution policy must have realistic goals, be integrated into the national economic development plan, and address the causes of migration in both rural and urban sectors. Policies to manage and channel rural-to-urban migration in order to maximize its benefits may be more efficient than trying to stop it.

Government Concern

Many governments have expressed concern about the distribution of their populations, and especially about urbanization. For example, the Parliamentary Conference on Population and Development in Africa, held in 1981, concluded:

> Governments are particularly concerned about the uneven spatial distribution of population in relation to resources, particularly land and water, which is unfavourable to integrating the population into economic, social and political activities. They feel that this trend is in conflict with development aims. The situation has worsened during the last 10 or 20 years due to population growth, although the cause is not entirely due to demographic processes. (458)

Table 8. Government Perceptions of Population Trends, 1980

Region	No. of Countries	Fertility	Spatial Distribution	Immigration	Emigration
		% Satisfactory	% Appropriate	% Satisfactory	% Satisfactory
DEVELOPING REGIONS					
Africa	46	52	0	83	87
Asia & Pacific	29	31	7	83	83
Latin America & Caribbean	30	37	3	77	70
Middle East & North Africa	21	43	14	76	76
Total	126	42	5	80	80
DEVELOPED REGIONS					
Total	37	78	35	84	76

Note: For fertility, categories were: too low—higher rates desirable; satisfactory; and too high—lower rates desirable. For spatial distribution, categories were: appropriate (given above); partially appropriate; and inappropriate. For immigration and emigration, categories were: immigration/emigration significant and either too low, satisfactory, or too high; immigration/emigration not significant and more desired; or situation satisfactory.

Source: United Nations (UN). Department of International Economic and Social Affairs. Population Division. World population trends and policies: 1981 monitoring report. Vol. 2. Population policies. New York, UN, 1982.

According to the Governor of Jakarta in 1970, "urbanization has come to such a hopelessly bad situation that it can endanger the safety of living and order in the capital" (276).

In every area of the world, more nations consider population distribution a problem than fertility. Among the developing countries, 22 percent are satisfied with fertility, in contrast to only 5 percent that rate their population distribution as fully appropriate (see Table 8). Also, more than twice as many developing countries have policies to slow or reverse internal migration as have policies to lower fertility (see Table 9).

Much of the concern with population distribution stems from fears that too rapid rural-to-urban migration could retard economic development (see p. M-262). Frequently, however, governments simply want to reduce the burden on public services and all-too-visible poverty and unemployment in the capital city, which they associate with in-migrants. The in-migrants also may be perceived as a political threat — the nucleus of a discontented urban proletariat. Concerns for regional and individual equity also may be important. Other motives include a rural ideological orientation, as in China; national defense, as in South Korea; and ethnic political balance, as in Malaysia (100, 367, 506, 555).

Rural Development

Governments have hoped that rural development activities would not only stimulate more food production, but also discourage large-scale migration to the city. The assumption is that higher rural incomes can reduce the economic incentive to migrate, while more services and amenities can raise the rural standard of living closer to that of urban levels (20, 97, 236, 470, 499, 500).

Table 9. Government Policies on Population Trends, 1980

Region	Number of Countries	% of Countries with Policy to: Lower Fertility	% of Countries with Policy to: Slow or Reverse Internal Migration
DEVELOPING REGIONS			
Africa	46	20	76
Asia & Pacific	29	52	72
Latin America & Caribbean	30	30	77
Middle East & North Africa	21	24	71
Total	126	30	75
DEVELOPED REGIONS			
Total	37	0	70

Source: United Nations (UN). Department of International Economic and Social Affairs. World population trends and policies: 1981 monitoring report. Vol. 2. Population policies. New York, UN, 1982.

Rural development projects include a wide range of activities, from capital-intensive measures, such as providing irrigation, farm machinery, and high-yield crop varieties, to land reform, introduction of labor-intensive agricultural techniques, and the provision of infrastructure and social services (182, 440). Thus evaluating the overall effects of rural development programs on migration is difficult. On the whole, however, rural development programs have a poor record in slowing rural-to-urban migration (182, 499, 500). In part, this may be because of failure to implement programs fully (460, 470, 558). An even more basic problem is that many rural development activities may promote rather than discourage migration (182, 499, 500). A recent analysis of 15 types of rural development activities concluded that 11 could have mixed impacts or might actually accelerate rural-to-urban migration in the short or long term (499, 500). Family planning was one of the few that would unambiguously discourage migration in the long run (499, 500) (see Table 10). Rural development may be more successful in promoting alternative mobility patterns, such as commuting or migrating to smaller cities, than in stopping out-migration altogether (193, 499, 500, 550).

One danger of rural development is that capital-intensive agricultural innovations are accessible only to large-scale farmers who have money or credit. As the rising production of the big farms lowers crop prices, the small farmer comes under pressure to sell out (182, 499) or to send children to the city so that they can send back remittances to finance new agricultural technology (583). Also, paid laborers may be displaced by the tractors and other machinery (182, 337, 440, 499, 558, 599). More labor-intensive innovations, such as simple farm implements or fertilizers, may generate more jobs and more income for smaller farmers, but the evidence on this point is scanty (182).

Land reform might hold back rural out-migration (499, 500), but without technical and financial assistance for small farmers new economic disparities have formed between smaller and larger farmers (182). Another problem, seen in many Latin American programs, is that little land is

Table 10. Possible Impact on Migration of Development Activities in Rural Areas

Development Activity	Possible Effect on Rural Population	Impact on Migration	
		Short Run	Middle or Long Run
Family planning programs	Decreased fertility and population pressure	—	Moderate slowing
Land reform	Increased rural production, income, social change, and demand for urban goods and services; decreased demand for hired labor	Moderate slowing	Mixed
Land rent ceilings, tenancy controls	Mechanization, eviction of tenants	Weak acceleration	Weak acceleration
Land colonization and rural resettlement	New opportunities for farmers	Weak slowing	—
"Green Revolution" high-yield seeds and fertilizer	Increased income, modernity, demand for urban goods and services and modern farm inputs; increased land value and tenant eviction; increased rural-urban integration and utilization of labor; disruption of traditional power structure and local political economy	Moderately weak acceleration	Moderately strong acceleration
Farm mechanization	Either decreased or increased demand for labor and increased rural-urban integration	Moderate acceleration	Moderate acceleration
Mechanical irrigation	Increased production, rural income, and demand for urban goods and services	Slowing	Moderate slowing
Agricultural services; credit and technical assistance	Increased income for large farmers, commercialization and modernity of agriculture; increased exclusion of small farmers; increased rural inequity and poverty	Mixed	Weak acceleration
Off-farm employment in rural enterprises	Increased employment and income; increased economic activity in market centers; acquisition of management skills	Strong acceleration of rural to small-town migration. Weak slowing of rural-to-city migration.	Moderate acceleration of migration to towns and cities
Rural public works	Increased employment, familiarity with modern sector, and demand for urban goods and services	Strong slowing	Moderate acceleration
Rural roads	Increased rural-urban integration and commercialization of agriculture	Strong slowing	Strong acceleration
Rural electrification	Increased agricultural activity, income, and rural-urban integration	Very weak slowing	Very weak slowing
Rural social services and education	Increased modern, urban skills and attitudes	Weak slowing	Very strong acceleration
Potable water supply	Improved health, productivity, and income	Weak slowing	Mixed
Rural health services and improved diet	Decreased general mortality and increased population pressure; increased productivity and income; decreased fertility and infant mortality	Weak slowing	Mixed

Source: Rhoda, R. Rural development and urban migration: can we keep them down on the farm? International Migration Review 17(1): 34–64. Spring 1983.

actually distributed (460, 462, 463). Also, continued population growth has weakened the initial impact of land reform in some areas. Either landholdings must be further fragmented for the next generation or most children must be excluded from the land. In either case out-migration will increase (100, 182, 268, 336).

Other approaches to discourage rural out-migration, including the creation of rural industrial jobs, public works programs, and school construction, also have mixed effects. Rural industries often are not labor-intensive and locate in small towns rather than truly rural areas (182, 593). Public works programs temporarily employ unskilled labor but teach workers skills and aspirations that might encourage them to migrate to larger centers eventually (499, 500). Building roads reduces the cost of marketing agricultural produce and so increases farm income, but it also makes out-migration easier (110, 128, 182, 378, 569, 593, 619). Building rural schools stops youths from migrating in search of education, but it provides them with both the desire and the credentials to find an urban job (96, 369, 406, 499, 500, 617).

Urban Barriers to Migration

Administrators of rapidly growing cities have tried to discourage the influx of migrants by reducing housing and jobs. The demolition of squatter settlements has been the most common tactic throughout Latin America, Africa, and Asia (7, 147, 553, 568, 596). Demolition rarely succeeds for long, however, because most of the evicted return and resume squatting — often in the same location (147). Nor does it seem to discourage further in-migration. Periodic demolition of most squatter settlements in Nairobi, for example, may have influenced urban settlement patterns, but it did not stop in-migration (568).

Limiting migrant employment may be more effective. During the crackdown on migration into Jakarta in the early 1970s, sidewalk vending and *becaks* (bicycle rickshaws) were barred from downtown. The restrictions eliminated two major sources of employment for migrants and induced some migrants to leave (456). More recently, in 1981, there were clashes between the national police and *ambulantes* (street vendors) in Lima, Peru, when the *ambulantes* were forcibly removed from the center city streets to rental stalls in open air markets (376). This policy has been so difficult to enforce that the city had to create a special police force to control the *ambulantes*.

Other attempts to restrict internal migration have involved urban residence permits. The Governor of Jakarta, for example, established a formal pass system in 1970. New migrants received a temporary residence card when they deposited with the police a sum of money equal to two times their return fare. Six months later they could obtain a permanent residence card by proving that they had a job and a place to live, or else they were given a one-way ticket home (440, 456). There was a sharp drop in the number of new arrivals in Jakarta for a year after the system was set up, but this was more likely due to the exceptionally good harvest than to the closed-city policy (251). In Africa, governments in the Congo, Niger, Tanzania, and Zaire all have tried at one time or another to expel the unemployed from their cities, but all attempts have failed for lack of enforcement (247, 506).

Only where there are severe restrictions on individual movement can permit systems succeed. Although not motivated primarily by economic concerns, the strictly enforced internal passport system in South Africa, for example, has prevented the mass migration of blacks into the cities (167). In Cuba the overall system of ration, residence, and worker identification cards, although not directly monitored for migration purposes, has probably made it harder to move to Havana (344, 647). In many countries such systems would not be legal or acceptable.

A few countries, such as Vietnam and China, have attempted even more rigorous measures to reverse migration and reduce the size of the major cities (66, 107, 112, 126, 188, 485). In China some 10 to 15 million youths born and raised in the city were moved to rural areas, or "rusticated," from the 1950s to the 1970s, and an even greater number of country-bred students in city schools were returned to rural areas (66). Even at great cost in human suffering, these measures have not been fully successful.

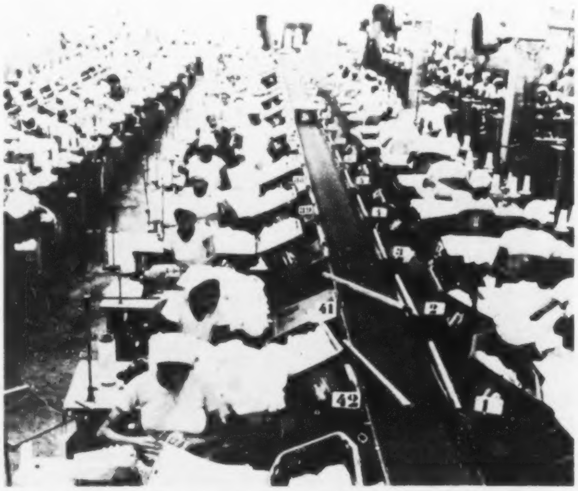
Overall, efforts to limit city residence and/or employment depend on a strong administrative structure, coercive measures, and the availability of government-controlled jobs or benefits that an individual might lose by attempting to migrate. At best, such efforts are likely to cause ill-feeling, petty corruption, and a rise in various forms of illegal and evasive behavior (193, 274, 336). Unless other political considerations are involved, the costs are likely to outweigh the presumed benefits.

Encouraging the Growth of Small Cities

Where continued urbanization is accepted as inevitable but the capital city is thought to be growing too large, governments may use various incentives to channel migrants towards smaller cities. Most often the government names some existing cities to be regional centers. Concepción (Chile), Valencia (Venezuela), and Khon Kaen (Thailand) are three examples (190, 419, 592). Sometimes governments build entirely new cities partly to stimulate migration to a different area. Among famous examples are the newly constructed capitals Brasilia (Brazil) and Islamabad (Pakistan) (495). There are also plans to shift the capitals in Nigeria and Tanzania (596, 705). Venezuela used oil earnings during the 1960s and 1970s to build Ciudad Guayana, a new industrial city (100, 218, 517). Current plans in Egypt envision a series of small new cities to absorb over 15 million people by the year 2000 (298). Three are already under construction (3).

Most policies attempt to relocate jobs to attract migrants. The government may move its own agencies to smaller cities. It also may encourage businesses to do so by building industrial parks; providing needed infrastructure and services such as roads, electricity, and communication; offering tax exemptions; subsidizing interest rates on loans; and prohibiting industrial expansion in the major cities (190, 336, 453, 502, 590, 592). Finally, the government may encourage individuals to move to the regional centers by providing information about opportunities there in contrast to the costs of life in the capital (295).

While the relocation of public-sector jobs has influenced population distribution, few businesses have responded to incentives to move. The largest city often has the only source of skilled labor, the largest market, and access to the government (190, 502, 595). During the two years following the implementation of Tanzania's decentralization policy in 1970, only 10 of 30 major new industries located



Women work in a new textile factory in northeastern Brazil. Governments may divert migrants to alternative destinations by influencing where businesses locate — through tax incentives, loans, and zoning regulations. (World Bank/J. Pickerell) outside Dar es Salaam (595). The growth center strategy has been most effective when it has spread growth to towns near the capital, as in South Korea, Mexico, and Venezuela. These systems of satellite cities tend to expand the capital into a megalopolis, however, rather than to divert growth to a different part of the country (419, 446, 555, 590).

Even in relatively successful efforts, the number of people affected may be disappointing (100). After 10 years of investment and settlement in Brasilia, in 1970 the total population in the new capital was only equal to the annual increment in the growth of São Paulo (495). New industrial towns may generate relatively little employment if the industries are capital-intensive (218, 336), as was the case with new industries in the northeast of Brazil and in Ciudad Guayana (100, 190).

There are two additional drawbacks to encouraging the growth of smaller cities: high cost and the possibility that they may in fact accelerate migration to the capital. The Venezuelan government, for example, spent $2 billion (US) from 1965 to 1975 to establish Ciudad Guayana (336). Providing infrastructure in distant areas or subsidizing industry also is costly (336, 440, 502). Better transportation and communication between the newly developed area and the capital may actually stimulate migration to the capital or primate city (558). Thus, out-migration from northeastern Thailand has not slowed and may have increased since Khon Kaen was designated a development center in 1962 (592).

Colonizing the Frontiers

Governments can encourage migration to rural destinations if there is sparsely populated, arable land available. There are several reasons for colonization programs: to distribute the population more evenly, to expand agricultural production, to provide land for the landless, or to enhance national security along border areas (51). In the short term, these population movements ease population pressure in the areas of origin, which may discourage further out-migration (462). The potential of colonization programs is limited, however, by the availability of land (336, 594).

New roads, such as this one being built in Brazil, can have conflicting effects on migration. While roads may open up areas to colonization or raise rural incomes by lowering the cost of going to market, they also make migration to cities easier. (World Bank/T. Sennett)

Government supports for colonization range from creating complete new communities to merely building roads. In many countries, including Brazil, Indonesia, and Malaysia, the government has recruited and transported the migrants, cleared the land, built roads and utilities, constructed houses, supported the settlers for a year or two, and offered technical assistance and credit (49, 265, 384). The cost of government-sponsored communities has been high, ranging from $2,000 (US) per family settled in Nigeria to $11,000 in Malaysia (193, 224). The more successful programs have spent $5,000 or more per family, but money alone does not guarantee success (224). Colonization also takes place spontaneously as families travel to frontier areas without government support, often making use of newly constructed roads, as has occurred in Brazil, Bolivia, and the Ivory Coast (51, 218, 321). Obviously, the cost per settler is far less where colonization occurs spontaneously (51), and the more motivated, spontaneous settlers may be more likely to stay (589).

Colonization programs have had a mixed record of success (51, 193, 588). In India over one-third of the colonists deserted the Dandakaranya project (440), while up to 90 percent left some settlements in eastern Bolivia (589). Even in relatively successful programs with low desertion rates, the absolute number of people involved may be small (50, 100, 555). One of the largest and best administered programs, the FELDA program in Malaysia, by 1980 had shifted 379,000 people, or less than 3 percent of the national population (432), and those people were probably not potential rural-to-urban migrants (223). In part because of road-building and colonization programs, the Brazilian frontier had a 50 percent growth rate from 1960 to 1970, but even so the growth rate in urban areas was 61 percent (685). Without colonization, of course, urban growth might have been even higher.

Administrative effectiveness and political commitment have proved to be the most important determinants of the success or failure of colonization programs (224). Problems have included divided or shifting responsibility among different government agencies, poor choice of sites and settlers, and inability to supply promised technical assistance, tools, credit, and infrastructure (49, 51, 384, 481, 555, 578, 588).

Coping with Migration

Instead of trying to slow or stop rural-to-urban migration, governments may accommodate the migrants by improving housing and creating more jobs in the cities. This approach eases the problems produced by rapid urban growth but, because these measures are indirect subsidies to migrants, almost certainly encourages continued in-migration (193, 506, 612). In fact, all urban development efforts, regardless of their motives, both help cities to cope with increased populations and attract more migrants.

Housing. Most accommodation policies have focused on housing, perhaps because it is the most visible of urban problems. The traditional approach has been to relocate squatters and slum dwellers to low-rent public housing projects. Unfortunately, these are often so expensive to build that rents are set far too high for migrants (147, 334, 596, 684).

Neighbors pour cement for a house foundation in Lima. In order to cope with the housing shortage, some governments are providing lots with basic services to in-migrants who build their own houses. (Susan Lobo, *A House of My Own* (359))

Beginning in the 1960s, innovative governments recognized that the needs of so many migrants could be met only with cheap, self-help housing of the kind that already existed in the squatter settlements (147). In Lima the emphasis was put on selling to the squatters, at a nominal cost, titles to the land that they occupied (140). Studies in Manila and Ankara, as well as in Lima, show that squatters have made dramatic improvements in their housing once they gained a legal right to it (300, 334). Other programs provide roads, sewer connections, piped water, electricity, schools, and health clinics to existing squatter settlements (61, 147, 159, 334, 359, 684). Even minimal services are costly, however. For example, the electrification of the squatter settlements in Caracas, Venezuela, cost Bs 4.5 million (US $1 million) from 1965 to 1973 (419).

"Sites and services" projects are another urban self-help scheme for migrants and other poor city dwellers. The government divides vacant land into housing lots, supplies roads and utilities, and sells or leases the lots to people who build their own houses (140, 147, 281, 567). These projects use tenant labor and local materials to build housing, thus saving money; they suit the squatters' preference for location and land tenure over amenities; and they preserve existing squatter investments in housing (334, 684). They still are not cheap, however, given the numbers to be served. A development for 40,000 families in Port-au-Prince, Haiti, is projected to cost $13 million (US) for land and $1.9 million for infrastructure. House foundations for 18,000 families are projected to cost an additional $3.2 million (170). In addition to costs, locations far from jobs, unfulfilled promises of services, insufficient numbers of lots, and unrealistically high construction standards have been problems in projects around the world, including Dakar, Nairobi, Dar es Salaam, and Lima (334, 359, 417, 568, 595).

Employment. One early attempt to provide more jobs for a growing urban population was made in Kenya. In the 1964 Tripartite Agreement the trade unions agreed to forego wage increases, while the government and major private employers promised to increase total employment by 15 and 10 percent, respectively. The labor force did expand, but the new jobs stimulated further in-migration, so there was no decrease in unemployment (506). More recently, the government of Manila has tried to increase its payroll by using labor-intensive methods to provide services such as street cleaning (334), while the government of Malaysia encourages street vending by providing loans, kiosks, markets, and training in business methods (440).

Political Problems and Policy Failure

One reason for the failure of internal migration policies is the lack of genuine political support (440, 495). Government support may be undermined by pressure from industry to allow continued growth of the urban labor supply and so keep wages down (357). Also, political leaders may want to invest in the capital city as a symbol of national independence and strength (503, 581, 590). Even when the political commitment exists, every change in government jeopardizes it (617). Lack of continuity is especially critical for population distribution policies, since most can make an impact only over many years, even decades (190, 495).

A second problem is policy making based on insufficient knowledge of specific migration trends, causes, and consequences (50, 440). Programs are not always tailored to the needs of a particular country. In addition, officials have unrealistically high expectations about how much a population distribution policy can accomplish and how quickly (504).

The third and probably most important problem is conflict between expressed population distribution goals and the effects on population distribution of other national development plans (181, 224, 495, 502, 590). For example, the geographic allocation of the national budget, national trade policies, minimum wage laws, and the location of government agencies all influence population distribution. Because more resources go into these measures than into population redistribution schemes, their impact outweighs most efforts to influence migration (193, 400, 502). Because of internal political pressures in developing countries, actual government investments usually favor urban areas, regardless of the avowed priority given to developing the rural sector (336, 404, 640). For example, Bujumburu, the capital city of Burundi, received 95 percent of the transportation and communication money and 85 percent of the housing, health, and education money in the 1980 national budget (236), even though its population is less than 4 percent of the national total (2). China and Cuba are exceptions to this pattern: resources of all kinds have been shifted to the rural sector and, partly as a result, urban growth has slowed (169, 554).

National trade policies tend indirectly to subsidize urban industries at the expense of agriculture (89, 495, 590). Thus, in West Africa, for example, government marketing boards and import/export duties keep at a minimum the prices that farmers obtain for their crops. At the same time, the government limits the price of staple foods in urban centers and so keeps the cost of urban living artificially low. Also, rural residents pay fees and taxes for services that primarily benefit city residents (239, 506).

Minimum wage laws routinely cover or are enforced for urban jobs only, in effect legislating a differential between rural and urban incomes (89, 163, 462, 590). This differential is thought to be one of the primary causes of migration (see p. M-253). When urban wages cannot fall as labor supply increases, the equilibrium effect of migration is impeded (252).

Centralization of government in the largest city also affects migration, since the government is a major employer (506). Also, businesses locate near government to deal with administrative agencies and to lobby (495, 640). Paradoxically, the more vigorous a role the government takes in economic and regional planning, the more likely it may be to stimulate migration to the capital.

These criticisms of population redistribution policies are supported by decades of experience in Western Europe. France, Great Britain, the Netherlands, and Sweden in fact have succeeded in reversing the migration streams into their capitals, but at great cost and only by making population distribution goals primary in their national development plans. These countries failed in initial attempts to influence migration simply by improving infrastructure and making low-interest loans to industries in designated development areas. Success was achieved only when the governments introduced a broad range of stronger measures: direct grants of 20 percent of the cost of new industrial projects in designated areas, the prohibition of new industry in congested cities, and the systematic relocation of government agencies and government-controlled industries (598). Reversals of urbanization are now taking place in a number of developed countries (660, 708). Since some of these countries lack redistribution policies, it is not clear how large a role policy plays.

In summary, governments lack control over many of the major influences on migration volume and patterns. They often have limited influence over the decisions of large private businesses, which can have an important impact on migration (503). Other major factors, such as distance, age structure, the size and growth rate of the labor force, and links between urban migrants and rural residents, can change only slowly at best. Thus effective short-term government policies would often have to be highly coercive and/or would require massive investments of scarce public funds and administrative resources that might be better spent on other development efforts.

POLICIES ON INTERNATIONAL MIGRATION

UN inquiries have revealed relatively little official dissatisfaction with international migration trends (635). As a basic element of national sovereignty, however, nations routinely regulate movement into and out of their territories by means of passports, visas, border checkpoints, and, in extreme cases, walls and other physical barriers. Border controls are supplemented by laws discriminating between the resident immigrant and the citizen (139, 371).

Currently there is much debate in labor-importing countries about curbing or strictly controlling further immigration and preventing the permanent settlement of immigrant laborers (326, 635). Restrictions have failed, however, to stop illegal migration or to prevent immigrants from settling. Thus policies to cope with resident immigrant populations are increasingly important (636). Labor-exporting countries, in contrast, are more concerned with maintaining emigration levels and maximizing economic returns. Their policies aim to protect emigrant citizens and to manage the flow of remittances (304, 628).

Immigration Policies

The governments of developed countries that have traditionally welcomed *permanent* immigrants, including Australia, New Zealand, Canada, and the United States, have recently reassessed their immigration policies. Discrimination based on national origins has been eliminated, but the number of immigrants admitted is still restricted. The current admissions policies of these countries are based on job skills and family ties (326, 636).

Some other countries, including Israel, South Africa, and most Latin American nations, actively encourage permanent immigration but on a selective basis. Most want skilled workers, while Israel accepts all Jewish migrants. None of these countries is now attracting as many immigrants as desired (628).

A third group of countries encourages or at least tolerates *temporary* immigrant workers to relieve labor shortages. Multilateral agreements have opened borders to workers within certain regions, including the Andean area, West Africa, Scandinavia, and the European Economic Community (139, 374, 628). Formal programs to recruit migrant labor from other countries now operate in South Africa and the Middle East (76, 158) and have been used in Europe and the United States (185, 326). In general, these countries try to limit the number of workers and their dependents admitted and to prevent them from settling permanently (326, 670).

Border controls are a common tactic to limit migration. Where land borders are long, however, it is almost impossible to stop migrants. Mexicans routinely slip into the United States by swimming the Rio Grande, while Colombians follow the *caminos verdes* (green trails) across the 1,500-mile frontier with Venezuela (185, 195). Would-be

The sign identifies the home of a *promotora*, who discusses and distributes contraceptives in migrant neighborhoods in Ciudad Juarez, Mexico. Family planning programs must take their services directly to migrants, because recent migrants may not know where to find services in an unfamiliar place. (Nancy Loy)

Family Planning Services for Migrants

Migrants pose a special challenge to family planning programs. Migrants are concentrated in the childbearing ages and generally come from rural areas or developing countries where contraception is less well-known and less used than in their urban or developed-country destinations (172, 256, 352, 410, 633, 664). Their need for special services varies, however, depending on how different they are, culturally and linguistically, from the usual family planning clients.

Rural-to-Urban Migrants

~~From what little~~ is known, rural-to-urban migrants' levels of contraceptive knowledge and practice fall somewhere between rural and urban levels. In São Paulo, Brazil, for example, in 1965, 78 percent of migrants had ever used contraception, compared with 85 percent of urban nonmigrants and 62 percent of rural nonmigrants (496). Studies in Bangkok and Manila, which could distinguish between recent and long-term migrants, found that levels of contraceptive knowledge and use rose with the duration of residence in the city. The migrants arrived in the city with the same levels of contraceptive knowledge and use as prevailed in the countryside. Gradually they took advantage of the easier access to family planning services and supplies. By five to seven years, their levels of contraceptive knowledge and use were equal to or greater than those of urban nonmigrants (215, 263).

Surveys in Thailand in 1970 and 1973 found that recent rural-to-urban migrants shared in the nationwide rise in levels of knowledge, approval, and practice of birth control, "suggesting that recency of in-migration in itself is not necessarily a major barrier to the assimilation of the fertility values and practices of women at the place of destination" (215). A study of obstacles to family planning among migrants in Rabat, Morocco, found that they were not related to migrant status, but consisted instead of factors that also deter many nonmigrants from using services — high costs, long waits, rude treatment by health professionals, and dependence on rumors for information (401).

Therefore, a strategy to extend and improve family planning programs for all the urban poor, rather than one that singles out migrants, may be the most efficient way to reach rural-to-urban migrants (10, 154, 667). Family planning programs trying to reach migrants in urban areas should concentrate on the location and the quality of their services. Services should be readily available in the squatter settlements and slums where migrants live, especially since recent migrants may have particular trouble locating urban services. Distributing contraceptives door-to-door or through migrants' social groups are good ways to reach migrants (183, 476).

Although the need and opportunity are great in urban areas, migrants to rural areas also need family planning services. In Malaysia, for example, the major colonization program, FELDA, has expanded the existing national family planning program to cover its new rural settlements. FELDA encourages family planning so that rapid population growth among settlers will not overwhelm the resources tapped by colonization (9, 255).

International Migrants

In some countries immigrants accompanied by their spouses form a large pool of potential clients for family planning programs. In West Germany, for example, 16 percent of all clients of Pro Familia in 1979 had come from another country (287). The Portuguese Commission on the Status of Women is trying to bring family planning information to Portuguese emigrants in other countries by distributing educational materials and making radio broadcasts (56). To date, special family planning programs for immigrants have been launched in Australia and several countries of Western Europe (256, 287). There are also special programs for Indochinese refugees in Thailand, Hong Kong, Australia, and the US (123, 329, 392, 480). Special programs such as these can be politically sensitive, partly because international migration is itself a political issue and partly because of suspicions that the motive for the programs is eugenic rather than humanitarian (171, 287).

What have family planning programs for international migrants discovered? First, language barriers pose an immediate problem. Indochinese migrants in Australia, for example, did not use the Family Planning Association because they could not make appointments, let alone discuss their needs with a counselor or doctor (256). Therefore many programs for migrants have translated written materials and hired interpreters or bilingual staff members (287, 329, 480). Second, family planning personnel have to understand how cultural differences affect their work. For example, they may not appreciate the importance that their clients place on the male in family planning decision-making; they may not be able to judge when clients fully understand instructions (256, 287, 329, 480). Third, family planning programs may have to make special efforts to reach migrants, by making home visits or by using migrant organizations and individuals to spread information about services (171, 256, 287). Illegal migrants may actively avoid contact with a family planning organization for fear of being deported.

Family planning programs that serve temporary immigrants may indirectly reach sending countries as well, since return migrants often take home positive attitudes and information about family planning. For example, Italians who have worked abroad may be partially responsible for increasingly favorable attitudes towards birth control in Italy (287). Yemeni men who have worked in Saudi Arabia are introducing oral contraceptives to the most conservative part of the country (420).

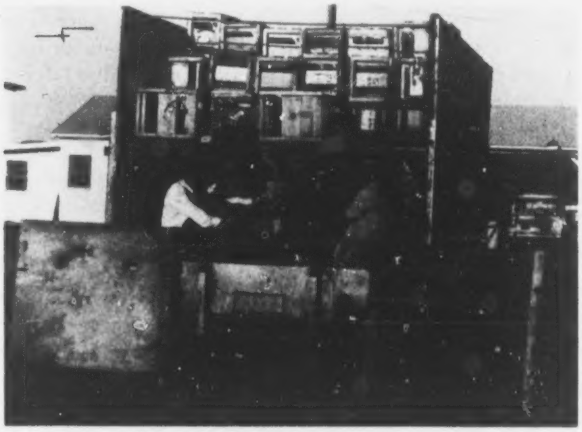
Overall, the same sympathetic, user-oriented approaches that reach migrants also enhance the quality of family planning for nonmigrants, including young people, men, ethnic communities, and people with little education. In fact, improved family planning services for all — not just for migrants — should be an integral part of population distribution policy.

workers also enter countries by posing as tourists, students, or even religious pilgrims (139, 294). Venezuela has fought this problem by requiring Latin American tourists to provide a bond or guarantee that they will leave (294). European countries have avoided stricter border controls because they would endanger the flourishing tourist industry (371).

Residence and work permits are used to keep track of legal migrants and to restrict the opportunities of illegal migrants (371). In Europe these permits are valid for a limited time only and may tie the holder to a specific job or occupation (270, 395, 411). African countries, such as Botswana, Niger, Sierra Leone, Sudan, and Zambia, issue work permits only when there are no local workers who possess the skills needed. In some of these countries, the immigrant is also required to train a local worker as an eventual replacement (285, 628). Enforcement problems limit the effectiveness of permit systems. Forged documents are usually available, and workers also may manage without valid permits. Punitive measures aimed at employers, such as those used in France, are probably more effective than penalties against the migrants themselves, such as those used in the United States (185, 325, 435).

Countries that encourage temporary labor migration may try to control the flow by assigning responsibility to a single government agency. This agency recruits the overseas workers, oversees their travel, and arranges for their jobs (70, 371, 411). According to a 1960 international agreement, for example, all Ivory Coast employers seeking workers from Upper Volta must apply through the national labor departments of the two countries. The government of the Ivory Coast pays Upper Volta a fee of CFAF 1,500 (about US$6) per worker. Most Upper Voltan workers evade this system, however, and directly contact employers in the Ivory Coast (137).

The oil-producing Persian Gulf states have extensive policies to try to ensure that migrants working there ultimately return home. Work and residence permits are strictly enforced; workers are forbidden to bring dependents to join them; and the labor-importing countries increasingly prefer Asian workers, who can be segregated and excluded from society more easily than other Arabs (565, 628). Thus immigrants in the Middle East are without political rights, social benefits, the freedom to change jobs, or any possibility of becoming citizens (670). The Arab oil exporters also are turning to integrated project packages, in which a foreign company supplies labor as well as management, engineering, equipment, and supplies. Migrant workers thus remain employees of a firm from their own nation and are employed for a single project only (304, 562, 565, 628).



Despite controls, illegal immigration is common in many areas. Here, Mexicans trying to enter the US hid in a compartment in the back of a truck, but they were discovered and deported. (US Immigration and Naturalization Service)

Dealing with Illegal Migrants

In most areas immigration controls do little to stop illegal migration. Although impossible to count precisely, illegal immigrants may number up to 700,000 in the Ivory Coast, one million in Western Europe, one to two million in Venezuela, and three to six million in the United States (305, 513, 607, 628, 652, 690). Perhaps one million were recently expelled from Nigeria (2, 121, 166).

Governments may tolerate illegal immigrants as long as their labor is needed, the economy is prosperous, and political relations with labor-exporting countries are amicable. Argentina, for example, accepts illegal migration as a way to increase the supply of manual labor and the country's population size (294). Economic recession and political tension may disturb this tolerance, however. France, for example, has consistently adjusted the levels of migration permitted from Algeria to reflect the state of diplomatic relations between the two countries (403). In the US and Europe the number of deportations rises and falls with economic prosperity (185, 325).

The mass expulsion of migrants from Nigeria is only the most recent of many such expulsions around the world, carried out in response to political and economic pressures (19, 294). Libya expelled first Tunisian workers in 1976 and then Egyptians in 1977 for foreign policy reasons (177). In Africa expulsions of previously tolerated, undocumented migrants, for both economic and political reasons, have been occurring for more than two decades (19, 239, 628). In the Western hemisphere Honduras and Venezuela have resorted to expulsions (12, 148). Massive expulsions cause economic problems both for the labor-importing country, which suffers sudden labor shortages, and the labor-exporting country, which is forced to absorb many workers on short notice (18, 28, 121, 122).

European countries have used less drastic measures to encourage unwanted migrants to return home. France has been most active: during 1975–80 almost 1,700 migrants received industrial and agricultural training before going home, and over 93,000 received either F 5,000 or F 10,000 each between 1977 and 1981. These programs affected only a few of the four million foreigners in France, however, and in addition may chiefly have helped migrants who were already planning to return (325, 340, 520). France, West Germany, and the Netherlands also have offered financial and technical assistance to return migrants trying to start businesses in their home countries (340, 350, 520, 677).

The alternative to forcing or encouraging departures is to accommodate the migrants (508). France, for example, has a long tradition of allowing migrants to regularize their status after entering the country illegally, while Argentina, Venezuela, Canada, and the Netherlands have granted amnesties to illegal migrants for brief periods (70, 201, 435, 628). Following the Action Program adopted by the European Economic Community in 1976, West Germany, France, Belgium, and the Netherlands are working to eliminate discrimination against migrants; to provide them with education, vocational training, and social security benefits; and to reunite migrants' families (29, 70, 284, 395, 411, 507). While making migrant populations stable, these policies do not grant migrants citizenship and full political rights (613, 628). In the US, while illegal migrants are sometimes sought out and deported, any children of migrants born in the US are automatically US citizens.

Emigration Policies

Many communist countries and a few developing countries, including Algeria, Iraq, and Syria, have tried to limit the emigration of skilled workers by refusing to issue them passports and other documents. Such policies can be difficult to enforce. Furthermore, they may backfire by encouraging skilled illegal emigrants to stay away permanently rather than temporarily (139, 203, 403). Other techniques also have been used to discourage emigration. Haiti charges high fees for passports, exit visas, and return visas (37). Jordan offers incentives to keep skilled workers at home, including tax exemptions and fringe benefits in health, education, and housing (124, 203). Some countries, including Iraq and Taiwan, have also tried to repatriate emigrant professionals by offering financial incentives or jobs (11, 628, 710).

Most emigration policies are designed to encourage but control the flow of labor through:

- formal recruitment procedures,
- bilateral agreements with labor-importers, and
- organizations to support and protect citizens abroad.

Government employment services in countries such as Colombia, Turkey, Morocco, Egypt, Upper Volta, and Mauritius provide information about job vacancies abroad, recruit workers, and prepare them for the trip. In the Philippines and Thailand the government works toward the same ends through private employment agencies. These employment services have not been able to prevent individual contacts between employers and workers, however (137, 284, 350, 628, 646). South Korea has developed a new approach, now used by many Asian countries, that involves restricting foreign firms from recruiting workers and at the same time promoting integrated project packages to export management, engineering, equipment, and labor (304, 628).

In Europe some labor-exporting countries have tried to assure the welfare of their emigrants through bilateral agreements (137, 327, 348, 515). Italy, for example, in negotiations with Switzerland, tried to ensure equal salaries, accident insurance, social welfare benefits, and medical care for migrants, as well as the rights to job mobility, resident status, and immigration of dependents. Because Italy's bargaining position was weak, the results were limited (102). By contrast with Europe, bilateral agreements are rare in the Middle East (139). Also in Europe, special organizations to protect migrant workers and to strengthen the migrants' ties to the home country have been established (403, 515). Various international organizations, including the United Nations General Assembly and the International Labour Organisation, are also continuing their efforts to ensure the human rights of international migrants (284, 707).

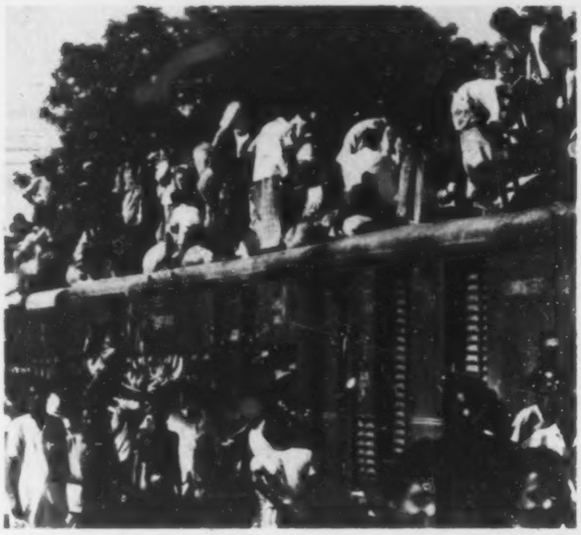
Some labor-exporting countries have argued that they should be compensated for their loss of manpower. Compensation proposals include a global tax system, an international fund financed by labor-importers and disbursed to labor-exporters, and bilateral agreements on payments from importers to exporters (71, 82, 304). Administrative problems, equity issues, and, above all, political problems prevent implementation of any compensation scheme.

Women hoping to emigrate apply at a West German recruitment office in Turkey. Many labor-exporting countries encourage their citizens to migrate because remittances are a source of income, foreign exchange, and potential investment. (ILO)

Managing Remittances

The governments of labor-exporting countries have tried both to increase the amount of remittances and to channel the money into productive investments (104, 304). Remittances equal to a fixed percentage of wages are compulsory for miners from Lesotho, Swaziland, and Botswana, construction workers and seamen from the Philippines, and South Korean company workers (158, 304, 628). Most countries, however, rely on incentives to bring money home and keep it out of black-market exchanges. Many offer emigrants special, high rates of exchange or allow them to maintain foreign-currency accounts in home banks at attractive interest rates (104, 176, 203, 327, 372, 515). Others, including Colombia, Spain, Turkey, Bangladesh, India, Sudan, and Tunisia, also permit emigrant workers to import some kinds of goods duty free (104, 175, 372, 416, 520, 600).

There have been reports from Morocco, Bangladesh, and India that these incentives are effective in capturing remittances (104, 372, 628). The only quantitative analysis of remittance policies, dealing with Greece, Yugoslavia, and Turkey, reached different conclusions, however. It found that (1) high-interest foreign exchange accounts did not increase remittances but only replaced domestic currency accounts, (2) special exchange rates did not encourage remittances through official channels, and (3) official chan-



High fertility and low wages in rural areas spur many young men to migrate. Family planning programs can in the long run help reduce the pressure for migration. (World Bank/T. Sennett)

nels did not lose remittances when black market exchange rates were more favorable (600).

A few governments seek to direct remittances and migrants' savings into investment. Turkish authorities developed agricultural production cooperatives whose members had first priority for jobs abroad but were required to remit money to the cooperative. The scheme, however, reached fewer than 23,000 workers, was poorly managed, and was poorly enforced (350). In Tunisia, Turkey, and Yugoslavia, government programs encourage return migrants to invest their savings in new or existing businesses and so create jobs for themselves (175, 520, 677).

The International Monetary Fund (IMF) has addressed a different kind of remittance issue — the balance of payments problem created by fluctuating remittances. Since 1979 developing countries have been permitted to borrow from the IMF when remittance income drops suddenly, just as they do when other exports earn less than expected (222).

POPULATION DISTRIBUTION AND POPULATION GROWTH POLICIES

While population distribution and population growth are both of intense interest to policy makers in many countries, there is an "artificial but well-entrenched" division between population distribution policies and population growth policies (484). Little attention has been given either to the relationships between population growth and distribution or to the impact that policy directed at one has on the other. Yet in many cases population distribution efforts may be more successful if they also address the causes and effects of population growth.

Theoretical Bases for Policies

In the development of policies on population growth, the theory of the demographic transition has proved useful. Demographic transition theory suggests that populations move from a predevelopment equilibrium of high birth and high death rates with little population growth; through a phase of development in which death rates fall faster than birthrates, causing rapid population growth; then through a fall in birthrates and a slower decline in death rates, eventually reaching another equilibrium with little population growth, only this time with both low birthrates and low death rates (438). While this theory, originally based on the historical experience of Europe and North America, has been much modified and refined by research over the past several decades, it remains the basic pattern against which specific observations of fertility and mortality are measured. This theory, with its optimistic conclusion that an equilibrium with long life expectancy will eventually be gained, has helped shape fertility policy in much of the world. Governments seek to hasten the natural process, and reach the new equilibrium sooner, through family planning programs that help lower fertility while allowing couples the maximum freedom of decision making.

In the realm of population distribution policy, there is no widely accepted comparable theory that relates migration to a historical pattern of socioeconomic development. Wilbur Zelinsky proposed such a theory in 1971, calling it the theory of the mobility transition. The theory links a different pattern of mobility with each phase of the demographic transition. Large-scale rural-to-urban migration and emigration occur at the beginning of the demographic transition, in the period of rapid population growth. In the period of sharp fertility declines and more gradual mortality declines, however, rural-to-urban migration and emigration slow, while circulation increases greatly. In the advanced society with low fertility and mortality rates, people move often, but usually between cities (695, 696).

The historical theory of the mobility transition, along with some economic theories (see p. M-252), implies that present-day migration patterns in developing countries are a natural phase in the desirable course of development. Studies of Indonesia, Peru, West Africa, and Italy, however, have cast doubt on how widely applicable the theory is (34, 39, 276, 564). Moreover, the theory does not explain the causes of the mobility transition (695). Some economic theorists and researchers contend that current migration patterns are abnormal, impede development, and may be self-perpetuating rather than self-limiting (see p. M-262). There is no consensus on whether the current patterns of rapid urbanization and international migration are, on balance, harmful or helpful to economic development. The most recent thinking has led to a new perspective: the patterns, causes, and impacts of migration are varied and specific to the situation of each country. This perspective, combined with the disappointing performance of most population distribution policies, has led to the view that migration policy should try to maximize the benefits and minimize the costs of migration rather than try to stop existing flows.

Even as the goals of population distribution policy are being reassessed, so are the instruments of that policy. Research on the importance of rural-urban wage differentials has led to a new awareness of the effect of national economic policies and programs on migration. Minimum wage laws, food price controls, locations of government offices, communication and transportation projects — all these and more can influence migration patterns. Impacts on population distribution, however, usually play only a small part in determining policy on these matters. Furthermore, in many countries private business, not government, makes many of the important economic decisions on employment and location of new factories. Therefore the search for appropriate migration policy instruments is broadening. Investigations into the migration decision-making process have raised the possibility that changing the information available about places, and so changing people's perceptions of those places, may be as effective as altering actual conditions. Even the evidence that migrants follow in the footsteps of their friends and relatives has generated ideas about how to trigger migration streams to new areas.

Impact of Family Planning Programs on Population Distribution

Population growth policies — for the most part fertility reduction policies implemented through family planning programs — also have an important role to play in population distribution policy (544). They:

- address the problem of high natural growth rates, which are the major source of urban growth;
- help to reduce the volume of migrants to more manageable levels;
- reduce the rural/urban fertility difference that contributes to migration.

Since roughly 60 percent of urban growth in developing countries is due to natural increase, any policy concerned with limiting city size and slowing the speed of city growth must include a family planning element. The difference in the development of cities between the developed countries in the late 19th century — the period of fastest city growth there — and in the developing countries in the past three decades has not been the rate at which the population migrated from rural to urban residence. Those rates of urbanization are similar. Instead, the difference has been in the numerical growth of urban populations. Higher rates of natural increase are responsible (132, 484). If slower city growth is a goal of population distribution policy, then family planning programs are needed to address the major source of that growth.

The sheer number of people moving to the cities has been an important reason for concern about urban growth. Slower rural population growth will reduce the supply of potential migrants to the cities, even if the same proportion of the population actually does migrate. This will give the cities more time to respond to growth.

Both data on past growth and projections of future growth suggest the impact of overall population growth on cities. An analysis of the growth rates of over 1,200 cities found that city growth and national population growth were related on a one-to-one basis: for every percentage point of difference in national population growth, there was about one percentage point of difference in city growth (484). A projection of the future of a representative but hypothetical developing-country city of 4,000,000 people in 1980 shows specifically the impact that slowed population growth could have on urban growth. The city is assumed to be growing currently at a rate of 4.4 percent annually, about two-thirds of that due to natural increase; one-third, to in-migration. A drop in the total fertility rate from 4.8 to 3.0 in the city and from 6 to 4.8 in the rest of the country by the year 2000 would reduce the city population in 2000 from 9.4 million to 7.9 million and in 2025 from 25 million to 14 million (194).

In developing countries, rural total fertility rates are commonly 20 to 60 percent higher than urban total fertility rates (see Table 6, p. M-259). In some countries, such as Paraguay and El Salvador, the rural rate is as much as twice as high as the rate in the capital city (40). These differences exacerbate the rural-urban income gap and so increase the motivation to move to the city. If there were no economic growth and other things remained equal, higher rural fertility — and thus a faster growing labor supply in rural areas — would mean that productivity, and therefore wages, would drop faster in rural than in urban areas. Economic development may aggravate the problem. As incomes rise and people buy more, the expansion of rural jobs is eventually constrained by the limited availability of agricultural land and by the fact that, once basic food needs are met, people spend a diminishing portion of their new income on food. By comparison, greater flexibility in the supply of raw materials and in the demand for manufactured goods allows urban employment to expand more easily. Thus the gap between rural and urban job opportunities increases even faster. Theoretically, reducing the difference between rural and urban fertility rates might at least slow the widening of the gap. The impact would be felt only over the long run, of course.

Thus family planning may have an important impact on migration and population distribution. Around the world, family planning programs have been implemented in order to improve the health of women and children, to reduce population pressures that slow economic growth, and to help families improve their well-being (437). Many programs have gone far toward achieving these goals, and at a reasonable cost. As the relationship between population growth policies and population distribution policies becomes increasingly apparent, the impact of family planning on population distribution will be counted among the benefits of family planning. At the same time, family planning programs will be recognized as an integral and essential part of population distribution policy.

Migration accounts for 40 percent of urban growth in developing countries. Children born to city dwellers account for 60 percent, but many are children of recently arrived migrants. (ILO)

BIBLIOGRAPHY

Asterisk (*) designates an article that was of particular value in the preparation of this issue of **Population Reports**.

1. ANONYMOUS. Brief on the Expert Group Meeting on Population Distribution, Migration and Development, Hammamet, Tunisia, 21–25 March 1983. Population Headliners 99(Suppl.): 1-6. June 1983.

2. ANONYMOUS. Countries of the world and their leaders: yearbook 1983. Detroit, Gale Research, 1983. 1492 p.

3. ANONYMOUS. Egypt: urban growth encroaches on farmland. Draper Fund Report, No. 10, December 1981. p. 8–9.

4. ANONYMOUS. Expert Group Meeting on Methodology of Migration Measurement. Asian-Pacific Population Programme News 9(1–2): 6. 1980.

5. ANONYMOUS. Mexico: a need for "combative optimism." Draper Fund Report, No. 10, December 1981. p. 5–7.

6. ANONYMOUS. The 1980 census returns: fertility and migration data, and research results: 2. Migration data and analysis. Asian-Pacific Population Programme News (Special issue): 3–5. 1981.

7. ANONYMOUS. Philippines. In: Regional Organization for Inter Governmental Cooperation and Coordination (IGCC) in Population and Family Planning in South East Asia. Seminar on the effect on internal migration, urbanization and resettlement in the IGCC region on its population/family planning programmes, Jakarta, Indonesia, March 18–20, 1980. Kuala Lumpur, Malaysia, IGCC, 1980. (Paper No. 15) p. 58–67.

8. ANONYMOUS. Problems of the migrant families. Herald (Harare, Zimbabwe), June 1, 1983. p. 8.

9. ANONYMOUS. Special project paper on Federal Land Development Authority: Malaysia. (Part I). In: Asian Parasite Control Organization [APCO]. The 5th Conference of the Asian Parasite Control Organization, Jakarta, Indonesia, November 6–10, 1978: proceedings. Tokyo, APCO Secretariat, [1979]. p. 309–337.

10. ANONYMOUS. This family planning pioneer campaigns in a Catholic country. Raleigh Times, May 22, 1981.

11. ANONYMOUS. ROC's talent scouting mission well received. Science Bulletin 15(7): 1. July 1983.

12. ANONYMOUS. Venezuela starts deportations. Intercom 9(2): 6. February 1981.

13. ABADAN, N. Le non-retour à l'industrie, trait dominant de la chaine migratoire turque. [Failure to return to industry, the primary feature of the sequence of Turkish migration.] [FRE] Sociologie du Travail 14(3): 278–293. July-September 1972.

*14. ABADAN-UNAT, N., KELES, R., PENNINX, R., RENSELAAR, H. VAN, VELZEN, L. VAN, and YENISEY, L. Migration and development: a study of the effects of international labor migration on Bogazliyan District. Ankara, Turkey, Turk Press, [1976]. 386 p.

15. ABEYSEKERA, D. Regional patterns of intercensal and lifetime migration in Sri Lanka. Honolulu, Hawaii, East-West Population Institute, September 1981. (Papers of the East-West Population Institute No. 75) 46 p.

*16. ABU-LUGHOD, J. Migrant adjustment to city life: the Egyptian case. In: Breese, G.W., ed. The city in newly developing countries: readings on urbanism and urbanization. Englewood Cliffs, New Jersey, Prentice-Hall, 1969. p. 376–388.

17. ADAMS, D.W. Rural migration and agricultural development in Colombia. Economic Development and Cultural Change 17(1): 527–539. October 1968.

18. ADDO, N.O. Employment and labour supply on Ghana's cocoa farms in the pre- and post-aliens compliance order era. Economic Bulletin of Ghana 2(4): 33–50. 1972.

19. ADDO, N.O. Government-induced transfers of foreign nationals. In: Clarke, J.I. and Kosinski, L.A., eds. Redistribution of population in Africa. London, Heinemann, 1982. p. 31–38.

20. ADDO, N.O. The impact of public policies on migration and development in Ghana, with special reference to the Asutsuare sugar area. Geneva, International Labour Office, 1981. (Population and Labour Policies Programme Working Paper No. 110) 87 p.

21. ADDO, N.O. Internal migration differentials and their effects on sociodemographic change. In: Caldwell, J.C., ed. Population growth and socioeconomic change in West Africa. New York, Columbia University Press, 1975. p. 383–407.

22. ADELMAN, I. and ROBINSON, S. Migration, demographic change and income distribution in a model of a developing country. In: Simon, J.L., ed. Research in population economics: an annual compilation of research. Vol. 1. Greenwich, Connecticut, JAI Press, 1978. p. 1–26.

23. ADEPOJU, A. Migration and fertility: a case study in South-west Nigeria. [ENG, summary in FRE] In: Oppong, C., Adaba, G., Bekombo-Priso, M., and Mogey, J., eds. Marriage, fertility and parenthood in West Africa. (Papers from the 15th Seminar of the International Sociological Association Committee on Family Research, Lomé, Togo, January 1976) Canberra, Australian National University, 1978. (Changing African Family Project Monograph Series No. 4, Pt. 2) p. 491–506.

*24. ADEPOJU, A. Migration and socio-economic change in Africa. International Social Science Journal 31(2): 207–225. 1979.

25. ADEPOJU, A. Migration and socio-economic change in tropical Africa: policy and research. In: Balán, J., ed. Why people move: comparative perspectives on the dynamics of internal migration. Paris, United Nations Educational, Scientific and Cultural Organization, 1981. p. 317–336.

26. ADEPOJU, A. Rural-urban socio-economic links: the example of migrants in South-west Nigeria. In: Amin, S., ed. Modern migrations in Western Africa. London, Oxford University Press, 1974. p. 127–137.

27. ADLER, S. International migration and dependence. Hampshire, England, Saxon House, 1977. 235 p.

28. ADOMAKO-SARFOH, J. The effects of the expulsion of migrant workers on Ghana's economy, with particular reference to the cocoa industry. In: Amin, S., ed. Modern migrations in Western Africa. London, Oxford University Press, 1974. p. 138–155.

29. AGUIRRE MENENDEZ, J.M. Migration seen from Germany. Migration News 27(1): 15–25. January-March 1978.

30. AHLUWALIA, M.S. Inequality, poverty and development. Journal of Development Economics 3(4): 307–342. December 1976.

31. AKERMAN, S. Towards an understanding of emigrational processes. In: McNeill, W.H. and Adams, R.S., eds. Human migration: patterns and policies. Bloomington, Indiana University Press, 1978. p. 287–306.

32. AKIN, J., BILSBORROW, R., GULKEY, D., and POPKIN, B. Breast-feeding patterns and determinants in Jordan. [Draft] Chapel Hill, North Carolina, October 5, 1981. 42 p. (Unpublished)

33. ALAM, I. and CLELAND, J. Illustrative analysis: recent fertility trends in Sri Lanka. Voorburg, Netherlands, International Statistical Institute, November 1981. (World Fertility Survey Scientific Reports No. 25) 61 p.

34. ALBERONI, F. Aspects of internal migration related to other types of Italian migration. In: Jansen, C.J., ed. Readings in the sociology of migration. London, Pergamon Press, 1970.

35. ALEXANDER, J.R. Investment strategies and the problem of out-migration. Growth and Change 9(3): 14–21. July 1978.

*36. ALI, S.A., ARIF, A.A., HABIBULLAH, A.K.M., HOSSAIN, A.R.M.A., ISLAM, R., MAHMUD, W., OSMANI, S.R., RAHMAN, Q.M., and SIDDIQUI, A.M.A.H., Labor migration from Bangladesh to the Middle East. Washington, D.C., World Bank, April 1981. (World Bank Staff Working Paper No. 454) 396 p.

37. ALLMAN, J. Haitian migration: 30 years assessed. Migration Today 10(1): 7–12. 1982.

*38. ALONSO, W. The economics of urban size. Papers of the Regional Science Association 26: 67–83. 1971.

*39. AMIN, S. Introduction. [FRE, ENG] In: Amin, S., ed. Modern migrations in Western Africa. London, Oxford University Press, 1974. p. 1–121.

40. ANDERSON, J.E. Fertility estimation: a comparison of results of Contraceptive Prevalence Surveys in Paraguay, São Paulo State, Brazil, and El Salvador. In: [American Statistical Association (ASA)]. 1979 Proceedings of the Social Statistics Section. (Papers presented at the Annual Meeting of the American Statistical Association, Washington, D.C., August 13–16, 1979) Washington, D.C., ASA, 1979. p. 532–537.

41. ANKRAH, K.T. Assimilation or selectivity: a test of competing theses on the relationship between rural-urban migration and fertility in Ghana. [Doctoral dissertation, University of Cincinnati, 1979] Ann Arbor, Michigan, University Microfilms, 1980. (No. 8002083) 178 p.

42. ANN, L.S. Population, industrial development, and economic growth. In: Chen, P.S.J. and Fawcett, J.T., eds. Public policy and population change in Singapore. New York, Population Council, 1979. p. 229–240.

43. ARAUJO MORAES, N.L. DE. Migrações internas e saúde coletiva. [Internal migration and public health.] [POR] In: Costa, M.A., Graham, D.H., Madeira, J.L., Pastore, J., Araújo Moraes, N.L. De., and Geiger, P.P. Migrações internas no Brasil. [Internal migration in Brazil.] Rio de Janeiro, Instituto de Planejamento Econômico e Social/Instituto de Pesquisas, 1971. (Monografia No. 5) p. 121–153.

44. ARIZPE, L. Mujeres migrantes y economia campesina: análisis de una cohorte migratoria a la ciudad de México, 1940–1970. [Migrant women and the rural economy: analysis of a cohort of migrants to Mexico City, 1940–1970.] [SPA, summary in ENG] América Indigena 38(2): 303–326. April-June 1978.

*45. ARNOLD, F. and COCHRANE, S.H. Economic motivation versus city lights: testing hypotheses about inter-Changwat migration in Thailand. Washington, D.C., World Bank, 1980. 41 p.

46. ARRIAGA, E.E. Components of city growth in selected Latin American countries. Milbank Memorial Fund Quarterly 66(2, Pt. 1): 237–252. April 1968.

47. ARRIAGA, E.E. Some aspects of measuring internal migration. In: Brown, A.A. and Neuberger, E., eds. Internal migration: a comparative perspective. New York, Academic Press, 1977. p. 103–119.

48. BACH, R.L. Migration and fertility in Malaysia: a tale of two hypotheses. International Migration Review 15(3): 502–521. Fall 1981.

49. BAHRIN, T.S. Development planning: and settlement—policies and practices in South-East Asia. In: Pryor, R.J., ed. Migration and development in South-East Asia: a demographic perspective. Kuala Lumpur, Malaysia, Oxford University Press, 1979. p. 295–303.

50. BAHRIN, T.S. Land settlement: policies and practices in South East Asia. In: Regional Organization for Inter Governmental Cooperation and Coordination (IGCC) in Population and Family Planning in South East Asia. Seminar on the effect on internal migration, urbanization and resettlement in the IGCC region on its population/family planning programmes, Jakarta, Indonesia, March 18–20, 1980. Kuala Lumpur, Malaysia, IGCC, 1980. (Paper No. 20) p. 116–123.

51. BAHRIN, T.S. Review and evaluation of attempts to direct migrants to frontier areas through land colonization schemes. In: United Nations (UN). Department of International Economic and Social Affairs. Population distribution policies in development planning. New York, UN, 1981. p. 131–143.

52. BALAN, J. Agrarian structures and internal migration in a historical perspective: Latin American case studies. In: Morrison, P.A., ed. Population movements: their forms and functions in urbanization and development. Liège, Belgium, Ordina Editions, 1983. p. 151–185.

53. BANGLADESH. MINISTRY OF HEALTH AND POPULATION CONTROL. NATIONAL INSTITUTE FOR POPULATION RESEARCH AND TRAINING, and WESTINGHOUSE HEALTH SYSTEMS. Bangladesh Contraceptive Prevalence Survey—1979. Dacca, National Institute for Population Research and Training, June 1981. 135 p.

54. BARBER, W.J. Disguised unemployment in underdeveloped economies. Oxford Economic Papers 13(1): 103–115. February 1961.

*55. BARNUM, H.N. and SABOT, R.H. Education, employment probabilities and rural-urban migration in Tanzania. Oxford Bulletin of Economics and Statistics 39(2): 109–126. May 1977.

56. BARROS BAPTISTA, J. DE. [Comissão da Condição Feminina] [Family planning services for Portuguese migrants] Personal communication. July 28, 1983.

*57. BAUCIC, I. The effects of emigration from Yugoslavia and the problems of returning emigrant workers. The Hauge, Netherlands, Martinus Nijhoff, 1972. (European Demographic Monographs No. 2) 48 p.

58. BEALE, C.L. and FUGUITT, G.V. The new pattern of nonmetropolitan population change. In: Taeuber, K.E., Bumpass, L.L., and Sweet, J.A., eds. Social demography. New York, Academic Press, 1978. (Studies in Population) p. 157–177.

59. BEALS, R.E., LEVY, M.B., and MOSES, L.N. Rationality and migration in Ghana. Review of Economics and Statistics 49(4): 480–486. November 1967.

60. BEHRMAN, J.R. and WOLFE, B.L. Micro determinants of female migration in a developing country: are labor market or marriage market considerations more important? [1982]. 34 p. (Unpublished)

61. BELL, M. Botswana's way with self-help housing. Development Forum 10(8): 5. November 1982.

62. BENACHENHOU, A. Politiques rurales et migrations internes en Algérie. [Rural policies and internal migration in Algeria.] [FRE] In: Gaude, J., ed. Phénomène migratoire et politiques associées dans le contexte africain: études de cas en Algérie, au Burundi, en République-Unie du Cameroun et en Haute-Volta. Geneva, International Labour Office, 1982. p. 41–101.

63. BENKO, F. and BENKO, A. La evolución demográfica de Caracas. [The demographic evolution of Caracas.] [SPA] Caracas, Universidad Central de Venezuela, 1977. 17 p.

64. BERMUDEZ, V.V. Migración y marginalidad en el area metropolitana de San José. [Migration and marginality in the San José metropolitan area.] [SPA] In: Setimo Seminario Nacional de Demografía. Universidad de Costa Rica, Facultad de Ciencias Económicas, August 22–24, 1979. San José, Costa Rica, Dirección General de Estadística y Censos, Departamento de Publicaciones, 1981. p. 276–297.

65. BERNSTEIN, H. Patterns of migration in Tanzania. Geneva, International Labour Office, March 1981. (World Employment Programme Research, Population and Labour Policies Programme Working Paper No. 101, WEP 2-21/WP.101) 26 p.

66. BERNSTEIN, T.P. Up to the mountains and down to the villages: the transfer of youth from urban to rural China. New Haven, Connecticut, Yale University Press, 1977. 371 p.

*67. BERRY, B.J.L. City size and economic development: conceptual synthesis and policy problems, with special reference to South and Southeast Asia. In: Jakobson, L. and Prakash, V., eds. Urbanization and national development. Vol. 1. South and Southeast Asia urban affairs annuals. Beverly Hills, California, Sage, 1971. p. 111–155.

68. BERRY, E.H. Migration, fertility and social mobility: an analysis of the fertility of Ecuadorian women. [Tables] Presented at the 52nd Annual Meeting of the Population Association of America, Pittsburgh, Pennsylvania, April 14–16, 1983. 13 p.

69. BESSAT, C. and TROUVE, J. L'exode rural des jeunes et les politiques de développement: l'expérience camerounaise. [The exodus of young people from rural areas and the policies of development: the Cameroun experience.] [FRE] In: Gaude, J., ed. Phénomène migratoire et politiques associées dans le contexte africain: études de cas en Algérie, au Burundi, en République-Unie du Cameroun et en Haute-Volta. Geneva, International Labour Office, 1982. p. 165–237.

70. BEYER, G. The Benelux countries: Belgium, the Netherlands, Luxemburg. In: Kubat, D., Mehrländer, U., and Gehmacher, E., eds. The politics of migration policies: the First World in the 1970s. New York, Center for Migration Studies, 1979. p. 107–125.

71. BHAGWATI, J.N. The brain drain, compensation and taxation. In: International Union for the Scientific Study of Population (IUSSP). Economic and demographic change: issues for the 1980's. Proceedings of the Conference, Helsinki, Finland, 1978. Liège, Belgium, IUSSP, 1979. Vol. 3. p. 179–190.

72. BILDERBACK, L. [California State University, Fresno] [Migration in the eastern Caribbean] Personal communication, June 6, 1983.

73. BILSBORROW, R.E. Surveys of internal migration in low-income countries: issues of survey and sample design. Geneva, International Labour Office, October 1981. 164 p.

74. BILSBORROW, R.E. Surveys of internal migration in low-income countries: the need for and content of community-level variables. Geneva, International Labour Office, 1981. (UNFPA Project No. GLO/75/PO2) 63 p.

75. BIRKS, J. and SINCLAIR, C.A. Demographic settling amongst migrant workers. [ENG, summary in FRE] In: International Population Conference. Vol. 2. (Papers of the 19th General Conference of the International Union for the Scientific Study of Population) Liège, Belgium, Ordina Editions, [1981]. p. 449–469.

*76. BIRKS, J.S. and SINCLAIR, C.A. International migration and development in the Arab region. Geneva, International Labour Office, 1980. 175 p.

77. BIRKS, J.S. and SINCLAIR, C.A. Migration and development: the changing perspective of the poor Arab countries. Journal of International Affairs 33(2): 285–309. Fall-Winter 1979.

78. BLAIR, J.A.S. Migration of agricultural manpower in Sierra Leone. Tijdschrift voor Economische en Sociale Geografie 68(4): 198–210. 1977.

79. BOEDER, R.B. The effects of labor emigration on rural life in Malawi. In: Page, M.E., ed. Rural Africana: current research in the social sciences. East Lansing, Michigan State University, African Studies Center, Spring 1973. (Land and Labor in Rural Malawi No. 20, Pt. 1) p. 37–46.

80. BÖHNING, W.R. International migration: implications for development and policies. (Prepared for Expert Group Meeting on Population Distribution, Migration and Development, Hammamet, Tunisia, March 21–25, 1983) [New York, UN], 1982. (IESA/P/ICP.1984/EG.II/8) 31 p.

*81. BÖHNING, W.R. Some thoughts on emigration from the Mediterranean Basin. International Labour Review 111(3): 251–277. March 1975.

82. BÖHNING, W.R. Towards a system of recompense for international labour migration. Geneva, International Labour Office, 1982. 81 p.

83. BÖHNING, W.R. Black migration to South Africa: what are the issues? Geneva, International Labour Office, June 1977. (World Employment Programme Working Paper, Migration for Employment Project: WEP 2-26/WP 10) 65 p.

84. BOOMEN, J. VAN DEN. [Economic Commission for Europe (ECE)] [ECE migration activities] Personal communication, August 15, 1983.

85. BOUVIER, L.F. Immigration: the other population issue. 1983. 13 p. (Unpublished)

86. BRACKETT, J.W., RAVENHOLT, R.T., and CHAO, J.C. The role of family planning in recent rapid fertility declines in developing countries. Studies in Family Planning 9(12): 314–323. December 1978.

87. BROWNING, H.L. and FEINDT, W. The social and economic context of migration to Monterrey, Mexico. In: Rabinovitz, F.F. and Trueblood, F.M., eds. Latin American urban research, Vol. 1. Beverly Hills, California, Sage, 1970. p. 45–70.

88. BRYANT, C., STEPHENS, B., and MACLIVER, S. Rural to urban migration: some data from Botswana. African Studies Review 21(2): 85–99. September 1978.

89. BYERLEE, D. and TOMMY, J.L. Rural-urban migration, development policy and planning. In: Udo, R.K., ed. Population education source book for sub-Saharan Africa. Nairobi, Heinemann, 1979. p. 216–225.

*90. CALDWELL, J.C. African rural-urban migration: the movement to Ghana's towns. New York, Columbia University Press, 1969. 257 p.

91. CALDWELL, J.C. The Sahelian drought and its demographic implications. [Washington, D.C.], American Council on Education, Overseas Liaison Committee (OLC), December 1975. (OLC Paper No. 8) 89 p.

92. CALDWELL, J.C. and CALDWELL, P. Cause and sequence in the reduction of postnatal abstinence in Ibadan City, Nigeria. In: Page, H.J. and Lesthaeghe, R., eds. Child-spacing in tropical Africa: traditions and change. London, Academic Press, 1981. p. 181–199.

93. CALDWELL, J.C. and CALDWELL, P. The role of marital sexual abstinence in determining fertility: a study of the Yoruba in Nigeria. Population Studies 31(2): 193–217. July 1977.

94. CAMPBELL, E.K. Some aspects of migration in the Western Area of Sierra Leone. In: Zachariah, K.C., Condé, J., Nair, N.K., Okoye, C.S., Campbell, E.K., Srivastava, M.L., and Swindell, K. Demographic aspects of migration in West Africa: Vol. 1. Washington, D.C., World Bank, September 1980. (World Bank Staff Working Paper No. 414) p. S.L.41–88.

95. CARDOSA, R. DE I. São Paulo's "periferias" are choked. Populi 9(3): 57–63. 1982.

96. CARINO, B.V. The Philippines: migration and regional development—the Bicol region. In: Pryor, R.J., ed. Migration and development in South-East Asia: a demographic perspective. Kuala Lumpur, Malaysia, Oxford University Press, 1979. p. 251–258.

97. CARINO, B.V. Socio economic consequences of migration in the Philippines. August 1981. 36 p. (Unpublished)

98. CARINO, B.V., CARINO, L.V., et al. Principal factors influencing migration: an analysis of individuals and households in Bicol. In: Population Center Foundation (PCF). Population Information Division. Population data information service: catalogue of research abstracts, No. 2. Makati, Philippines, PCF, 1977. p. 25–29.

*99. CARVAJAL, M.J. and GEITHMAN, D.T. An economic analysis of migration in Costa Rica. Economic Development and Cultural Change 23(1): 105–122. October 1974.

100. CENTRO LATINOAMERICANO DE DEMOGRAFIA (CELADE). Políticas de redistribución de la población en América Latina. [Population redistribution policies in Latin America.] [SPA] (Prepared for Expert Group Meeting on Population Distribution, Migration and Development, Hammamet, Tunisia, March 21–25, 1983) [New York, UN], March 3, 1983. (IESA/P/ICP.1984/EG.II/26) 30 p.

101. CERASE, F.P. Expectations and reality: a case study of return migration from the United States to Southern Italy. International Migration Review 8(2): 245–262. Summer 1974.

102. CERASE, F. Italy. In: Kubat, D., Mehrländer, U., and Gehmacher, E., eds. The politics of migration policies: the First World in the 1970s. New York, Center for Migration Studies, 1979. p. 233–245.

103. CHAN, P. The political economy of urban squatting in metropolitan Kuala Lumpur. January 1982. 41 p. (Unpublished)

*104. CHANDAVARKAR, A.G. Use of migrants' remittances in labor-exporting countries. Finance and Development 17(2): 36–39. June 1980.

105. CHANEY, E.M. and LEWIS, M.W. Women, migration and the decline of smallholder agriculture. October 1980. 56 p. (Unpublished)

106. CHANG, M.-C. The economic adjustment of migrants in Taiwan. Ann Arbor, University of Michigan, 1979. (Taiwan Population Studies Working Papers No. 40) 29 p.

107. CHANG, P.H. China's rustication movement. Current History 69(408): 85–89. September 1975.

108. CHAPMAN, M. Circulation. In: Ross, J.A., ed. International encyclopedia of population: Vol. 1. New York, Free Press, 1982. p. 93–98.

109. CHATTERJEE, A. and BOSE, A. Demographic data on internal migration and urbanization from census and NSS—an appraisal. In: Bose, A., Gupta, D.B., and Raychaudhuri, G., eds. Population statistics in India. New Delhi, Vikas, 1977. (Data Base of Indian Economy Vol. 3) p. 327–350.

*110. CHAUDHURY, R.H. Determinants and consequences of rural outmigration: evidence from some villages in Bangladesh. [ENG, summary in FRE] In: International Union for the Scientific Study of Population (IUSSP). Economic and demographic change: issues for the 1980's. Proceedings of the Conference, Helsinki, Finland, 1978. Vol. 2. Liège, Belgium, IUSSP, 1979. p. 213–228.

111. CHEN, C.-Y. and PICOUET, M. Dinámica de la población: caso de Venezuela. [The dynamics of population: the case of Venezuela.] [SPA] Caracas, Venezuela, Edició UCAB-ORSTOM, 1979. 725 p.

112. CHEN, P.-C. Overurbanization, rustication of urban-educated youths, and politics of rural transformation. Comparative Politics 4(3): 361–386. April 1972.

113. COLEMAN, G. Some implications of international labour migration from Malawi. In: International labour migration from Malawi. Norwich, England, University of East Anglia, 1979. (Development Studies Occasional Paper No. 1) p. 31–78.

*114. CONNELL, J., DASGUPTA, B., LAISHLEY, R., and LIPTON, M. Migration from rural areas: the evidence from village studies. Delhi, India, Oxford University Press, 1976. 228 p.

115. CORGEAU, D. Les migrations internes en France de 1954 à 1975. 1. Vue d'ensemble. [Internal migration in France between 1954 and 1975. 1. An overview.] [FRE, summary in ENG, SPA] Population 33(3): 525–545. May–June 1978.

116. CORNELIUS, W.A. The impact of cityward migration in Mexico City. In: White, J.W., ed. The urban impact of internal migration. Chapel Hill, University of North Carolina, Institute for Research in Social Science, 1979. (Comparative Urban Studies Project Monograph No. 5) p. 53–76.

117. CORNELIUS, W.A., Jr. The political sociology of cityward migration in Latin America: toward empirical theory. In: Rabinovitz, F.F. and Trueblood, F.M., eds. Latin American urban research, Vol. 1. Beverly Hills, California, Sage, 1970. p. 97–147.

118. CORNELIUS, W.A. Politics and the migrant poor in Mexico City. Stanford, California, Stanford University Press, 1975. 319 p.

119. CORREIA DE ANDRADE, M. and POTENGI, G.F. Microrregião Brejo Paraibano. [Brejo Paraibano microregion.][POR] In: Dinâmica das microrregiões de intensa atividade migratòria. Vol. 2. Recife, Brazil, Ministério do Interior, 1980. p. 231–292.

*120. COULIBALY, S., GREGORY, J., and PICHE, V. Les migrations voltaiques: Tome 1. Importance et ambivalence de la migration voltaique. [Migration in Volta: Vol. 1. The importance and ambivalence of migration in Volta.] [FRE] Ottawa, Canada, International Development Research Centre, 1980. (IDRC-147f) 144 p.

121. COWELL, A. At a homecoming in Ghana: few amenities, much worry. New York Times, February 4, 1983. p. A-1, A-4.

122. COWELL, A. A docile and somber exodus. New York Times, February 3, 1983. p. A-1, A-12.

123. D'AGNES, T. and D'AGNES, L. Community-based approach to refugee relief: experiences from Thailand. IPPF Medical Bulletin 16(5): 3–4. October 1982.

124. DAJANI, A. The manpower boomerang hits Jordan. ILO Information 6(4): 4. 1978.

125. DAKEYNE, R.B. Labour migration in New Guinea: a case study from Northern Papua. Pacific Viewpoint 8(2): 152–158. September 1967.

126. DAO VAN TAP. On the transformation and new distribution of population centres in the socialist republic of Vietnam. International Journal of Urban and Regional Research 4(4): 503–515. December 1980.

127. DASGUPTA, B. Rural-urban migration and rural development. In: Balán, J., ed. Why people move: comparative perspectives on the dynamics of internal migration. Paris, United Nations Educational, Scientific and Cultural Organization, 1981. p. 43–58.

128. DASGUPTA, B. and LAISHLEY, R. Migration from villages. Economic and Political Weekly 10(42): 1652–1662. October 18, 1975.

129. DAVANZO, J. Microeconomic approaches to studying migration decisions. In: De Jong, G.F. and Gardner, R.W., eds. Migration decision making: multidisciplinary approaches to microlevel studies in developed and developing countries. New York, Pergamon Press, 1981. p. 90–129.

130. DAVIS, K. The effect of outmigration on regions of origin. In: Brown, A.A. and Neuberger, E., eds. Internal migration: a comparative perspective. New York, Academic Press, 1977. p. 147–166.

131. DAVIS, K. The theory of change and response in modern demographic history. Population Index 29(4): 345–366. October 1963.

*132. DAVIS, K. World urbanization 1950–1970: Vol. 2. Analysis of trends, relationships, and development. Berkeley, University of California, 1972. (Population Monograph Series No. 9) 319 p.

133. DEERE, C.D. The differentiation of the peasantry and family structure: a Peruvian case study. Journal of Family History 3(4): 422–438. 1978.

134. DE JONG, G.F. and FAWCETT, J.T. Motivations for migration: an assessment and a value-expectancy research model. In: De Jong, G.F. and Gardner, R.W., eds. Migration decision making: multidisciplinary approaches to microlevel studies in developed and developing countries. New York, Pergamon Press, 1981. p. 13–58.

*135. DE JONG, G.F. and GARDNER, R.W., eds. Migration decision making: multidisciplinary approaches to microlevel studies in developed and developing countries. New York, Pergamon Press, 1981. 394 p.

136. DE JONG, G.F. and HARBISON, S.F. Policy intervention considerations: the relationship of theoretical models to planning. In: De Jong, G.F. and Gardner, R.W., eds. Migration decision making: multidisciplinary approaches to microlevel studies in developed and developing countries. New York, Pergamon Press, 1981. p. 281–290.

137. DENIEL, R. Mesures gouvernementales et/ou interêts divergents des pays exportateurs de main d'oeuvre et des pays hôtes Haute Volta et Côte d'Ivoire. [Governmental measures and/or conflicting interests of the manpower exporting countries and of the host countries—Upper Volta and Ivory Coast.] [FRE] In: Amin, S., ed. Modern migrations in Western Africa. London, Oxford University Press, 1974. p. 215–225.

*138. DIAZ-BRIQUETS, S. International migration within Latin America and the Caribbean: a review of available evidence. [Washington, D.C.], Population Reference Bureau, April 1980. 126 p. (Mimeo)

139. DIB, G. The legal framework of international migration. [ENG, summary in FRE] In: International Population Conference, Vol. 2. (Papers of the 19th General Conference of the International Union for the Scientific Study of Population) Liège, Belgium, Ordina Editions, [1981]. p. 431–447.

140. DIETZ, H.A. Metropolitan Lima: urban problem-solving under military rule. In: Cornelius, W.A. and Kemper, R.V., eds. Latin American urban research, Vol. 6. Metropolitan Latin America: the challenge and the response. Beverly Hills, California, Sage, 1978. p. 205–226.

141. DIETZ, H.A. Some local-level structural determinants of differences among the migrant poor in Lima, Peru. In: White, J.W., ed. The urban impact of internal migration. Chapel Hill, University of North Carolina, Institute for Research in Social Science, 1979. (Comparative Urban Studies Project Monograph No. 5) p. 77–96.

142. DIEZ-CANEDO-RUIZ, J. A new view of Mexican migration to the United States. Doctoral dissertation, [Massachusetts Institute of Technology], Cambridge, May 1980. 192 p.

143. DINERMAN, I.R. Patterns of adaptation among households of U.S.-bound migrants from Michoacan, Mexico. International Migration Review 12(4): 485–501. Winter 1978.

144. DORJAHN, V.R. The effects of labor migration on rural Liberia. In: Fulton, R.M., ed. Liberia: an evaluation of rural research. East Lansing, Michigan State University, African Studies Center, Summer 1971. (No. 15) p. 51–65.

145. DOUGHTY, P.L. Peruvian migrant identity in the urban milieu. In: Weaver, T. and White, D., eds. The anthropology of urban environments. Washington, D.C., Society for Applied Anthropology (SAA), 1972. (SAA Monograph Series No. 11) p. 39–50.

146. DOUGLAS, H.E. Pakistan: country of first asylum. In: United States. Committee for Refugees. World Refugee Survey 1982. [New York], American Council for Nationalities Service, 1982. p. 14–16.

*147. DRAKAKIS-SMITH, D. Urbanisation, housing and the development process. New York, St. Martin's Press, 1980. 234 p.

148. DURHAM, W.H. Scarcity and survival in Central America. Stanford, California, Stanford Univerity Press, 1979. 209 p.

149. DUSSAUZE-INGRAND, E. L'émigration Sarakollaise du Guidimaka vers la France. [The Sarakolese migration to France.] [FRE, summary in ENG] In: Amin, S., ed. Modern migrations in Western Africa. London, Oxford University Press, 1974. p. 239–257.

150. EBANKS, G.E., GEORGE, P.M., and NOBBE, C.E. Emigration and fertility decline: the case of Barbados. Demography 12(3): 431–445. August 1975.

*151. ECEVIT, Z.H. International labor migration in the Middle East and North Africa: trends, effects and policies. In: Kritz, M.M., Keely, C.B., and Tomasi, S.M., eds. Global trends in migration: theory and research on international population movements. Staten Island, Center for Migration Studies of New York, 1981. p. 259–275.

152. ECEVIT, Z. and ZACHARIAH, K.C. International labor migration. Finance and Development 15(4): 32–37. December 1978.

153. EDMONSTON, B. and MCGINNIS, S. Migrant-nonmigrant fertility differentials in metropolitan areas of Latin America. In: Smithsonian Institution. Interdisciplinary Communications Program. The dynamics of migration: internal migration and migration and fertility. Washington, D.C., Smithsonian Institution, December 1976. (Occasional Monograph Series No. 5, Vol. 1) p. 277–285.

154. EDMUNDS, M. and HELZNER, J.F. Peru-Mujer: women organizing for development. Chestnut Hill, Massachusetts, Pathfinder Fund, August 1982. (Pathpaper No. 9) 18 p.

155. EHRLICH, P.R., BILDERBACK, L., and EHRLICH, A.H. The golden door. New York, Ballantine, 1979. 402 p.

156. EJIOGU, C.N. Metropolitanization: the growth of Lagos. In: Caldwell, J.C., ed. Population growth and socioeconomic change in West Africa. New York, Columbia University Press, 1975. p. 308–320.

157. ELIZAGA, J.C. A study on immigrations to Greater Santiago (Chile). In: Breese, G.W., ed. The city in newly developing countries: readings on urbanism and urbanization. Englewood Cliffs, New Jersey, Prentice-Hall, 1969. p. 332–360.

*158. ELKAN, W. Labor migration from Botswana, Lesotho, and Swaziland. Economic Development and Cultural Change 28(3): 583–596. April 1980.

159. ENDRST, J. Botswana's self-help community. IDRC Reports 8(3): 12–13. September 1979.

160. ENGMANN, E.V.T. Some consequences of population movements. In: Ominde, S.H. and Ejiogu, C.N., eds. Population growth and economic development in Africa. London, Heinemann, 1972. p. 173–187.

*161. ERGUDER, Ü. Internal migration, politics and integration: Turkey. In: Rivlin, H.A.B. and Helmer, K., eds. The changing Middle Eastern city. Binghamton, State University of New York, 1980. p. 73–95.

162. ESPENSHADE, T.J., BOUVIER, L.F., and ARTHUR, W.B. Immigration and the stable population model. Demography 19(1): 125–133. February 1982.

*163. ESSANG, S.M. and MABAWONKU, A.F. Determinants and impact of rural-urban migration: a case study of selected communities in Western Nigeria. East Lansing, Michigan State University, 1974. (African Rural Employment Papers No. 10) 34 p.

164. EVIOTA, E. and SMITH, P.C. The migration of women in the Philippines. Honolulu, Hawaii, East-West Population Institute, June 1981. (Working Paper No. 13) 33 p.

165. FADAYOMI, T.O. Rural outmigration in Nigeria: its determinants and policy implications. Rural Africana (6): 47–61. (Reprinted as Nigerian Institute of Social and Economic Research Reprint Series No. 137) Winter 1980.

166. FAFOWORA, O.O. On the expulsion of illegal migrants from Nigeria. Population and Development Review 9(2): 391–392. June 1983.

167. FAIR, T.J.D. and DAVIES, R.J. Constrained urbanization: white South Africa and Black Africa compared. In: Berry, B.J.L., ed. Urbanization and counter-urbanization. Beverly Hills, California, Sage, 1976. p. 145–168.

168. FALARIS, E.M. The determinants of internal migration in Peru, an economic analysis. Southern Economic Journal 45(3): 327–341. January 1979.

169. FARINA, M.B. Urbanization, deurbanization and class struggle in China 1949–79. International Journal of Urban and Regional Research 4(4): 485–502. December 1980.

170. FASS, S.M. Port-au-Prince: awakening to the urban crisis. In: Cornelius, W.A. and Kemper, R.V., eds. Latin American urban research, Vol. 6. Metropolitan Latin America: the challenge and the response. Beverly Hills, California, Sage, 1978. p. 155–180.

171. FELLOUS, M. Introduction aux problèmes posés par la contraception dans les familles immigrées nord-africaines et portugaises. [Introduction to the problems posed by contraception in North African and Portuguese immigrant families.][FRE] In: Ecole Nationale de la Santé Publique. Troisièmes journées d'études sur la contraception, l'interruption volontaire de grossesse et la sexologie. Rennes, France, Ecole Nationale de la Santé Publique, 1976. p. 169–174.

172. FERRO BUCHER, J.S.N. Family planning of Portuguese immigrants and integration in Belgium. Psychologica Belgica 18(1): 12–26. 1978.

173. FERRY, B. The Senegalese surveys. In: Page, H.J. and Lesthaeghe, R., eds. Child-spacing in tropical Africa: traditions and change. London, Academic Press, 1981. p. 265–273.

174. FIELDS, G.S. Lifetime migration in Colombia: tests of the expected income hypothesis. Population and Development Review 5(2): 247–265. June 1979.

175. FINDLAY, A., FINDLAY, A., and LAWLESS, R. Crisis in Maghreb emigration: policy alternatives. Maghreb Review 4(3): 90–94. May–June 1979.

176. FINDLAY, A., FINDLAY, A., and LAWLESS, R. Moroccan emigration: a national and regional problem. Maghreb Review 4(3): 86–89. May–June 1979.

177. FINDLAY, A., FINDLAY, A., and LAWLESS, R. New directions in Tunisian emigration: windfall or pitfall? Maghreb Review 4(3): 78–81. May–June 1979.

178. FINDLAY, A.M. Migration in space: immobility in society. In: Blake, G.H. and Lawless, R.I., eds. The changing Middle Eastern city. London, Croom Helm, 1980. p. 54–76.

179. FINDLEY, S.E. Community-level variables and migration: a proposed theory and strategy of analysis. Presented at the 52nd Annual Meeting of the Population Association of America, Pittsburgh, Pennsylvania, April 16, 1983. 38 p.

180. FINDLEY, S.E. Migration survey methodologies: a review of design issues. Liège, Belgium, International Union for the Scientific Study of Population (IUSSP), 1982. (IUSSP Papers No. 20) 81 p.

*181. FINDLEY, S. Planning for internal migration: a review of issues and policies in developing countries. [Washington, D.C.], U.S. Department of Commerce, Bureau of the Census, 1977. 167 p.

*182. FINDLEY, S.E. Rural development programmes: planned versus actual migration outcomes. In: United Nations (UN). Department of International Economic and Social Affairs. Population distribution policies in development planning. New York, UN, 1981. p. 144–166.

183. FINDLEY, S.E., GUNDLACH, J.H., KENT, D.P., and RHODA, R. Rural development, migration and fertility: what do we know? Research Triangle Park, North Carolina, Research Triangle Institute and South East Consortium for International Development, June 1979. (Rural Development and Fertility Project; Contract No. AID/ta-CA-1) 227 p.

*184. FINKLE, J.L. and MCINTOSH, C.A. The consequences of international migration for sending countries in the Third World. [Ann Arbor], University of Michigan, Center for Population Planning, March 1982. 261 p.

185. FOGEL, W. Mexican illegal alien workers in the United States. Los Angeles, University of California, 1979. (Institute of Industrial Relations Monograph Series No. 20) 204 p.

186. FOX, R.W. Urban population growth trends in Latin America. Washington, D.C., Inter-American Development Bank, 1975. 103 p.

187. FRANQUEVILLE, A. Croissance démographique et immigration à Yaoundé. [Population growth and immigration to Yaoundé.][FRE, summary in ENG] Cahiers d'Outre-Mer 32(128): 321–354. October–December 1979.

188. FRASER, S.E. Vietnam's 1980 census: current position and future outlook. Contemporary Southeast Asia 3(3): 219–234. December 1981.

189. FRIEDLANDER, D. Demographic responses and population change. Demography 6(4): 359–381. November 1969.

190. FRIEDMANN, J. The implementation of regional development policies: lessons of experience. In: Urbanization, planning, and national development. Beverly Hills, California, Sage, 1973. p. 235–254.

191. FRIEDMANN, J. The role of cities in national development. In: Urbanization, planning and national development. Beverly Hills, California, Sage, 1973. p. 21–39.

*192. FRIEDMANN, J. and DOUGLASS, M. Agropolitan development: towards a new strategy for regional planning in Asia. In: Lo, F.-C. and Salih, K., eds. Growth pole strategy and regional development policy: Asian experience and alternative approaches. Oxford, Pergamon Press, 1978. p. 163–192.

193. FUCHS, R.J. Population distribution policies in Asia and the Pacific: current status and future prospects. 1982. 46 p. (Unpublished)

194. FUTURES GROUP. Futurba: interrelations of population factors and social and economic development in the great cities: 1980–2010. [Washington, D.C.], Futures Group, August 1980. 54 p.

195. GALL, N. Los indocumentados Colombianos. [The illegal residents of Colombia.] Fieldstaff Reports 16(2): 1–19. 1972. (East Coast South America Series)

196. GALLAGHER, D. and RUBIN, G. Seeking permanent solutions for refugees. In: United States. Committee for Refugees. World Refugee Survey 1982. [New York], American Council for Nationalities Service, 1982. p. 42–44.

*197. GALLIN, B. and GALLIN, R.S. The integration of village migrants into urban society: the case of Taipei, Taiwan. In: Thomas, R.N. and Hunter, J.M., eds. Internal migration systems in the developing world with special reference to Latin America. Boston, G.K. Hall, 1980. p. 152–176.

198. GARDNER, R.W. Macrolevel influences on the migration decision process. In: De Jong, G.F. and Gardner, R.W., eds. Migration decision making: multidisciplinary approaches to microlevel studies in developed and developing countries. New York, Pergamon Press, 1981. p. 59–89.

199. GARDNER, R.W., CARINO, B.V., and ARNOLD, F. Place perceptions and migration intentions. Presented at the 50th Annual Meeting of the Population Association of America, Washington, D.C., March 26–28, 1981. 37 p.

200. GARRISON, H. Internal migration in Mexico: a test of the Todaro model. Food Research Institute Studies 18(2): 197–214. 1982.

201. GARSON, J.-P. and MOULIER, Y. Clandestine immigrants and their regularisation in France, 1981-1982. Geneva, International Labour Office, May 10, 1982. 55 p.

*202. GARZA, G. and SCHTEINGART, M. Mexico City: the emerging megalopolis. In: Cornelius, W.A. and Kemper, R.V., eds. Latin American urban research, Vol. 6. Metropolitan Latin America: the challenge and the response. Beverly Hills, California, Sage, 1978. p. 51–85.

203. GERAKIS, A.S. and THAYANITHY, S. Wave of Middle East migration raises questions of policy in many countries. IMF Survey 8(17): 260–262. September 4, 1978.

*204. GILANI, I., KHAN, M.F., and IQBAL, M. Labour migration from Pakistan to the Middle East and its impact on the domestic economy. Washington, D.C., World Bank, South Asia Country Programs Department, June–July 1981. 257 p.

205. GILBERT, A. Bogotá: politics, planning, and the crisis of lost opportunities. In: Cornelius, W.A. and Kemper, R.V., eds. Latin American urban research, Vol. 6. Metropolitan Latin America: the challenge and the response. Beverly Hills, California, Sage, 1978. p. 87–126.

206. GLASER, W. The brain drain: emigration and return. Oxford, Pergamon Press, 1978. (United Nations Institute for Training and Research Report No. 22) 324 p.

*207. GMELCH, G. Return migration. Annual Review of Anthropology 9: 135–234. 1980.

208. GODFREY, M. Rural-urban migration in a "Lewis-model" context. Manchester School of Economic and Social Studies, No. 3, September 1979. p. 230–247.

*209. GOLDSCHEIDER, C. Modernization, migration, and urbanization. In: Morrison, P.A., ed. Population movements: their forms and functions in urbanization and development. Liège, Belgium, Ordina Editions, 1983. p. 47–66.

210. GOLDSTEIN, S. Interrelations between migration and fertility in Thailand. Demography 10(2): 225–241. May 1973.

211. GOLDSTEIN, S. Migration and fertility in Thailand, 1960–1970. Canadian Studies in Population 5: 167–180. 1978.

*212. GOLDSTEIN, S. and GOLDSTEIN, A. Migration and fertility in Peninsular Malaysia: the disruptive impact of migration on length of an analysis using life history data. (Prepared for the United States Agency for International Development) Santa Monica, California, Rand Corporation, January 1983. (Contract No. AID/OTR-G-1822) 117 p.

*213. GOLDSTEIN, S. and GOLDSTEIN, A. Surveys of migration in developing countries: a methodological review. Honolulu, Hawaii, East-West Population Institute, April 1981. (Papers of the East-West Population Institute No. 71) 120 p.

214. GOLDSTEIN, S. and GOLDSTEIN, A. Types of migration in Thailand in relation to urban-rural residence. [ENG, summary in FRE] In: International Union for the Scientific Study of Population (IUSSP). Economic and demographic change: issues for the 1980's. Proceedings of the Conference, Helsinki, Finland, 1978. Vol. 2. Liège, Belgium, IUSSP, 1979. p. 351–375.

*215. GOLDSTEIN, S., GOLDSTEIN, A., and LIMANONDA, B. Migration and fertility-related attitudes and behavior in urban Thailand. (Reprinted from Chang, Y., Kwon, T.H., and Donaldson, P.J., eds. Society in transition: with special reference to Korea. Seoul, Seoul National University Press, 1982. p. 213–257) Providence, Rhode Island, Brown University, Population Studies and Training Center, 1982. (PSTC Reprint Series No. 82-06) 45 p.

216. GOLDSTEIN, S., PRACHUABMOH, V., and GOLDSTEIN, A. Urban-rural migration differentials in Thailand. Bangkok, Chulalongkorn University, February 1974. (Institute of Population Studies Research Report No. 12) 50 p.

217. GOLLAS, M. La migración, el ingreso y el empleo urbanos. [Migration, income and urban employment.][SPA] Demografía y Economía 14(1): 1–26. 1980.

218. GONZALEZ, G. Políticas de población. [Population policies.][SPA] In: United Nations Educational, Scientific and Cultural Organization (UNESCO). Programa Regional de Educación en Población. Estudio de referencia sobre educación en población para America Latina: enfoque interdisciplinario y sistémico. Santiago, Chile, UNESCO, Oficina Regional de Educación para America Latina y el Caribe, 1982. p. 365–402.

219. GOODMAN, J.L. Information, uncertainty, and the microeconomic model of migration decision making. In: De Jong, G.F. and Gardner, R.W., eds. Migration decision making: multidisciplinary approaches to microlevel studies in developed and developing countries. New York, Pergamon Press, 1981. p. 130–148.

220. GORDENKER, L. Refugees in developing countries and transnational organization. Annals of the American Academy of Political and Social Science 467: 62–77. May 1983.

221. GORDON, E. An analysis of the impact of labour migration on the lives of women in Lesotho. Journal of Development Studies 17(3): 59–76. April 1981.

222. GOREUX, L.M. Compensatory financing facility. Washington, D.C., International Monetary Fund, 1980. (Pamphlet Series No. 34) 84 p.

223. GOSLING, L.A.P. Population redistribution: patterns, policies, and prospects. In: Hauser, P.M., ed. World population and development: challenges and prospects. Syracuse, New York, Syracuse University Press, 1979. p. 403–439.

224. GOSLING, L.A.P. The demographic implications of agricultural land settlements: a case study of Malaysia's FELDA (Federal Land Development Authority) schemes. In: Barlow, R., ed. Case studies in the demographic impact of Asian development projects. Ann Arbor, University of Michigan, Center for Research on Economic Development, 1982. p. 59–100.

225. GREEN, S.C. Migrant adjustment in Seoul, Korea: employment and housing. International Migration Review 12(1): 70–81. Spring 1978.

226. GREENWOOD, M.J. An analysis of the determinants of internal labor mobility in India. Annals of Regional Science 5(1): 137–151. June 1971.

227. GREENWOOD, M.J. The determinants of labor migration in Egypt. Journal of Regional Science 9(2): 283–290. August 1969.

*228. GREENWOOD, M.J. and LADMAN, J.R. An economic analysis of migration in Mexico. Annals of Regional Science 12(2): 16–31. July 1978.

229. GREENWOOD, M.J., LADMAN, J.R., and SIEGEL, B.S. Long-term trends in migratory behavior in a developing country: the case of Mexico. Demography 18(3): 369–388. August 1981.

230. GRIFFIN, E.C. and WILLIAMS, L.S. Social implications of changing population patterns: the case of rural depopulation in Colombia. In: Thomas, R.N. and Hunter, J.M., eds. Internal migration systems in the developing world with special reference to Latin America. Boston, G.K. Hall, 1980. p. 17–25.

231. GRIFFIN, L. On the emigration of the peasantry. World Development 4(4): 353–361. April 1976.

232. GRIFFITHS, S.L. Emigration and entrepreneurship in a Philippine peasant village. Papers in Anthropology 20(1): 127–143. Spring 1979.

233. GRIGG, D.B Migration and overpopulation. In: White, P. and Woods, R., eds. The geographical impact of migration. London, Longman Group, 1980. p. 60–83.

•234. GUGLER, J. Overurbanization reconsidered. Economic Development and Cultural Change 31(1): 173–189. October 1982.

235. GUGLER, J. and FLANAGAN, W.G. On the political economy of urbanization in the Third World: the case of West Africa. International Journal of Urban and Regional Research 1(2): 272–292. June 1977.

•236. GUICHAOUA, A. La mobilité rurale en Afrique des Hautes terres centrales surpeuplées: le cas du Burundi. [Rural migration in Africa from the overpopulated central highlands: the case of Burundi.] In: Gaude, J., ed. Phénomène migratoire et politiques associées dans le contexte africain: études de cas en Algérie, au Burundi, en République-Unie du Cameroun et en Haute-Volta. Geneva, International Labour Office, 1982. p. 103–164.

237. GUYOT, J., PADRUN, R., DAUPHINET, E., JOSPA, Y., FISCHLI, E., MESTRAL, M. DE., GIUDICI, D., and SCHEIDECKER, C. Migrant women speak. London, Search Press and World Council of Churches, 1978. 164 p.

238. GWAN, E.A. Types, processes, and policy implications of various migrations in Western Cameroon. In: Smithsonian Institution. Interdisciplinary Communications Program. The dynamics of migration: internal migration and migration and fertility. Washington, D.C., Smithsonian Institution, December 1976. (Occasional Monograph Series No. 5, Vol 1) p. 1–40.

239. GWATKIN, D.R Governmental population policies. In: Caldwell, J.C., ed. Population growth and socioeconomic change in West Africa. New York, Columbia University Press, 1975. p. 169–184.

240. HABERKORN, G. The migration decision-making process: some social-psychological considerations. In: De Jong, G.F. and Gardner, R.W., eds. Migration decision making: multidisciplinary approaches to microlevel studies in developed and developing countries. New York, Pergamon Press, 1981. p. 252–278.

241. HACETTEPE INSTITUTE OF POPULATION STUDIES. Turkish fertility survey 1978. First report. Vol. 1: methodology and findings. Ankara, Hacettepe Institute of Population Studies, 1980. (World Fertility Survey) 213 p.

242. HADLEY, L.H. The migration of Egyptian human capital to the Arab oil-producing states: a cost-benefit analysis. International Migration Review 11(3): 285–299. Fall 1977.

243. HAITI. INSTITUT HAITIEN DE STATISTIQUE. and WORLD FERTILITY SURVEY. Enquête haitienne sur la fécondité 1977: rapport national vol. 1. [Haitian fertility survey 1977: national report vol. 1.] [FRE] [Port-au-Prince], Institut Haitien de Statistique, January 1981. (World Fertility Survey) 140 p.

244. HALLI, S.S Effect of migration on urban fertility in India with special reference to Greater Bombay. Journal of Family Welfare 23(2): 20–27. December 1976.

245. HAMMEL, E.A. The influence of social and geographical mobility on the stability of kinship systems: the Serbian case. in: Brown, A.A. and Neuberger, E., eds. Internal migration: a comparative perspective. New York, Academic Press, 1977. p. 401–415.

246. HAMMICHE, B. and BENSALAH, K. Rural migration into cities in Arab countries. Its impact on urban population, on the economy, and on educational needs: the Algerian case. In: Kjurciev, A. and Farrag, A.M., eds. Population-education-development in the Arab countries. (Overview of discussion topics and condensed version of papers presented at the Regional Seminar of Experts on Population-Education-Development in the Arab Countries, ASFEC, Egypt, February 21–29, 1976) Beirut, Lebanon, UNESCO Regional Office for Education in the Arab Countries, 1977. p. 235–251.

247. HANCE, W.A. Controlling city size in Africa. [ENG, summary in FRE] In: La croissance urbaine en Afrique noire et à Madagascar, Tome 2. Paris, Editions du Centre National de la Recherche Scientifique, 1972. p. 653–658.

248. HANSEN, N. Europe's guest worker policies and Mexicans in the United States. Growth and Change 10(2): 2–8. April 1979.

249. HARBISON, S.F. Family structure and family strategy in migration decision making. In: De Jong, G.F. and Gardner, R.W., eds. Migration decision making: multidisciplinary approaches to microlevel studies in developed and developing countries. New York, Pergamon Press, 1981. p. 225–251.

250. HARBISON, S.F. and WEISHAAR, M.E. Samoan migrant fertility: adaptation and selection. Human Organization 40(1): 268–273. Spring 1981.

251. HARRIS, J.R. Internal migration in Indonesia. In. White, J.W., ed. The urban impact of internal migration. Chapel Hill, University of North Carolina, Institute for Research in Social Science, 1979. (Comparative Urban Studies Project Monograph No. 5) p. 125–148.

•252. HARRIS, J.R. and TODARO, M.P. Migration, unemployment and development: a two-sector analysis. American Economic Review 60(1): 126–142. March 1970.

•253. HART, J.K. Migration and the opportunity structure: a Ghanaian case-study. In: Amin, S., ed. Modern migrations in Western Africa. London, Oxford University Press, 1974. p. 322–342.

254. HART, K. Migration and tribal identity among the Frafras of Ghana. Journal of Asian and African Studies 6(1): 21–36. January 1971.

255. HASHIM, A. Family planning activities in FELDA land schemes in Malaysia. In: Inter Governmental Coordinating Committee (IGCC) Secretariat. Report: Regional workshop on adult education and family planning, Singapore, December 17–21, 1973. Kuala Lumpur, Malaysia, IGCC, [1974]. p. 163–183.

256. HAWKEN, C. Preventing unplanned pregnancies. Medical Journal of Australia 1(6): 344–351. March 25, 1978.

257. HAWLEY, A.H., FERNANDEZ, D., and SINGH, H. Migration and employment in Peninsular Malaysia, 1970. Economic Development and Cultural Change 27(3): 491–505. April 1979.

258. HAWLEY, A.H., UDRY, J.R., LEOPRAPAI, B., and CARDONA, R. Urbanward migration and the labor force in two developing countries—Thailand and Colombia. Chapel Hill, University of North Carolina, Carolina Population Center, July 1981. (Paper No. 18) 20. p.

259. HAWLEY, A.H., UDRY, J.R., LEOPRAPAI, B., CARDONA, R., and GADALLA, S. Urbanward migration and the labor force in three developing countries: Colombia, Egypt, and Thailand. Chapel Hill, North Carolina, Carolina Population Center, 1981. 20 p. (Mimeo)

260. HAWRYLYSHYN, O. Ethnicity as a barrier to migration in Yugoslavia: the evidence from interregional flows and inmigration to Belgrade. In: Brown, A.A. and Neuberger, E., eds. Internal migration: a comparative perspective. New York, Academic Press, 1977. p. 379–399.

261. HAYGHE, H. [U.S. Bureau of Labor Statistics] [U.S. civilian labor force in 1980] Personal communication, July 25, 1983.

•262. HEISEL, D. Sources of data for the study of international migration. In: Couch, S.R., Bryce-Laporte, R.S., and Kubler, M.E., eds. Quantitative data and immigration research. Washington, D.C., Smithsonian Institution, 1979. (Research Institute on Immigration and Ethnic Studies Research Notes No. 2) p. 3–33.

263. HENDERSHOT, G.E. Knowledge and use of contraceptives and family planning clinics among rural-urban migrants in Manila. Manila, University of the Philippines System, August 1, 1974. (Population Institute Research Note No. 14) 5 p.

264. HENDERSHOT, G.E. Social class, migration, and fertility in the Philippines. In: Smithsonian Institution. Interdisciplinary Communications Program. The dynamics of migration: internal migration and migration and fertility. Washington, D.C., Smithsonian Institution, December 1976. (Occasional Monograph Series No. 5, Vol. 1) p. 197–257.

265. HENRIQUES, M.H.F.T., PACHECO, L.M.T., and PETRUCCELLI, J.L. The demographic dynamics of a frontier area: Rondonia. Research Report No. 1. Basic concepts and preliminary description. May 1980. 47 p. (Unpublished)

266. HEROLD, J.M. Female migration in Chile: types of moves and socioeconomic characteristics. Demography 16(2): 257–275. May 1979.

267. HERRICK, B.H. Urban migration and economic development in Chile. Cambridge, Massachusetts, MIT Press, 1965. (MIT Monographs in Economics No. 6) 126 p.

268. HERZ, B.K. Demographic pressure and economic change: the case of Kenyan land reforms. Doctoral dissertation, [Yale University], New Haven, Connecticut, 1974. 329 p.

269. HIDAY, V.A. Migration, urbanization, and fertility in the Philippines. International Migration Review 12(3): 370–385. Fall 1978.

270. HOFFMANN-NOWOTNY, H.-J. and KILLIAS, M. Switzerland. In: Kubat, D., Mehrländer, U., and Gehmacher, E., eds. The politics of migration policies: the First World in the 1970s. New York, Center for Migration Studies, 1979. p. 193–206.

271. HOLMES, D.N., Jr. Introduction. In: Smithsonian Institution. Interdisciplinary Communications Program. The dynamics of migration: internal migration and migration and fertility. Washington, D.C., Smithsonian Institution, December 1976. (Occasional Monograph Series No. 5, Vol. 1) p. 191–196.

272. HORNBY, W.F. and JONES, M. Case study 9: some aspects of population migration in East Africa. In: An introduction to population geography. Cambridge, England, Cambridge University Press, 1980. p. 127–136.

273. HOUSE, W.J. and REMPEL, H. The determinants of interregional migration in Kenya. World Development 8(1): 25–35. January 1980.

274. HOUSTON, C.J. Administrative control of migration to Moscow, 1959–75. Canadian Geographer/Geographe Canadien 23(1): 32–44. Spring 1979.

275. HUGO, G.J. Implications of the imbalance in age and sex composition of sub areas as a consequence of migration: the case of a rural developing nation—Indonesia. [ENG, summary in FRE] In: International Population Conference. Vol. 2. (Papers of the 19th General Conference of the International Union for the Scientific Study of Population) Liège, Belgium, Ordina Editions, [1981]. p. 387–415.

276. HUGO, G.J. New conceptual approaches to migration in the context of urbanization: a discussion based on the Indonesian experience. In: Morrison, P.A., ed. Population movements: their forms and functions in urbanization and development. Liège, Belgium, Ordina Editions, 1983. p. 69–113.

•277. HUGO, G.J. Population mobility in West Java. Yogyakarta, Indonesia, Gadjah Mada University Press, 1978. (Indonesian Population Monograph Series No. 2) 335 p.

•278. HUGO, G.J. Village-community ties, village norms, and ethnic and social networks: a review of evidence from the third world. In: De Jong, G.F. and Gardner, R.W., eds. Migration decision making: multidisciplinary approaches to microlevel studies in developed and developing countries. New York, Pergamon Press, 1981. p. 186–224.

279. HULL, C.V. The strategies of migration and return migration: a Yucatecan case study. Doctoral dissertation, [Wayne State University], Detroit, Michigan, 1980. 134 p.

280. HUYCK, E.E. and BOUVIER, L.F. The demography of refugees. Annals of the American Academy of Political and Social Science 467: 39–61. May 1983.

281. HWANG, M.-C. Growth and management of Seoul metropolitan region. Presented at Conference on Urbanization and National Development, Honolulu, Hawaii, January 25–29, 1982. 66 p.

282. IBRAHIM, S.E. A critical review: internal migration in Egypt. Cairo, Population and Family Planning Board, January 1982. (Research Monographs Series No. 5) 96 p.

283. INTERNATIONAL ASSOCIATION FOR METROPOLITAN RESEARCH AND DEVELOPMENT (INTERMET). and INTERNATIONAL DEVELOPMENT RESEARCH CENTRE. Town drift: social and policy implications of rural-urban migration in eight developing countries. [Toronto, Canada, INTERMET], 1973. 230 p.

284. INTERNATIONAL LABOUR OFFICE (ILO). General survey of the reports relating to conventions nos. 97 and 143 and recommendations nos. 86 and 151 concerning migrant workers. (International Labour Conference, 66th Session, 1980) Report III, part 4B. Geneva, ILO, 1980. 189 p.

285. INTERNATIONAL LABOUR OFFICE (ILO). Migrant workers: summary of reports on conventions nos. 97 and 143 and recommendations nos. 86 and 151 (Article 19 of the Constitution). (International Labour Conference, 66th Session, 1980) Report III, part 2. Geneva, ILO, 1980. 151 p.

286. INTERNATIONAL LABOUR OFFICE (ILO). Yearbook of labour statistics 1979. Annuaire des statistiques du travail 1979. Anuario de estadisticas del trabajo 1979. [ENG, FRE, SPA] Geneva, ILO, 1979. 711 p.

•287. INTERNATIONAL PLANNED PARENTHOOD FEDERATION (IPPF). Final report to the Regional Council on the Migrant and Planned Parenthood Project. London, IPPF, Europe Region, 1982. 62 p.

288. INTERNATIONAL STATISTICAL INSTITUTE. and WORLD FERTILITY SURVEY. The Senegal Fertility Survey 1978: a summary of findings. Voorburg, Netherlands, International Statistical Institute, September 1981. (World Fertility Survey Country Summary No. 30) 14 p.

289. INTERNATIONAL UNION FOR THE SCIENTIFIC STUDY OF POPULATION (IUSSP). WORKING GROUP ON THE METHODOLOGY FOR THE STUDY OF INTERNATIONAL MIGRATION. Utilization of population census data for compilation of international migration data: recommendations of the IUSSP Working Group on the Methodology for the Study of International Migration. Liège, Belgium, IUSSP, [1981]. 6 p.

290. IYOHA, M.A. A theory of rural-urban migration in developing countries. Nigerian Journal of Economic and Social Studies 17(2): 29–39. July 1975.

291. JELIN, E. Domestic servants in the Latin American cities. In: Huston, P. Rural women at work: strategies for development in South Asia. Baltimore, Johns Hopkins University Press, 1978. p. 67–74.

292. JIMINEZ, E. The value of squatter dwellings in developing countries. Economic Development and Cultural Change 30(4): 739–752. July 1982.

•293. JOHNSON, G.E. and WHITELAW, W.E. Urban-rural income transfers in Kenya: an estimated-remittances function. Economic Development and Cultural Change 22(3): 473–479. April 1974.

294. JOHNSON, K.F. and WILLIAMS, M.W. Illegal aliens in the Western Hemisphere: political and economic factors. New York, Praeger, 1981. 207 p.

295. JONES, R.C. and ZANNARAS, G. The role of awareness space in urban residential preferences: a case study of Venezuelan youth. Annals of Regional Science 12(1): 36–52. March 1978.

296. JORDAN. DEPARTMENT OF STATISTICS. Jordan fertility survey 1976. Principal report. Vol. 1. Amman, Department of Statistics, 1979. (World Fertility Survey) 170 p.

297. JOSHI, H., LUBELL, H., and MOULY, J. Urban development and employment in Abidjan. International Labour Review 111(4): 289–306. April 1975.

298. KANDIL, R. E.-S. Future planning for population distribution in Egypt. [ENG, ARA] Presented at Population and Family Planning in Egypt, [Cairo], February 17–21, 1980. (PFPE Doc./24) 21 p.

299. KANE, T.T. The fertility of guestworker populations in the Federal Republic of Germany: 1961–1981. [Tables] Presented at the 52nd Annual Meeting of the Population Association of America, Pittsburgh, Pennsylvania, Apirl 14–16, 1983. 3 p.

•300. KARPAT, K.H. The *gecekondu*: rural migration and urbanization. Cambridge, England, Cambridge University Press, 1976. 291 p.

301. KAYASTHA, S.L. and MUKHERJI, S. Spatial disorganisation and internal migration in India: some strategies for restructuring the space economy and development. Canadian Studies in Population 6: 45–61. 1979.

302. KAYSER, B. Cyclically-determined homeward flows of migrant workers and the effects of emigration. Paris, Organisation for Economic Co-operation and Development, 1972. 56 p.

303. KAYSER, B. European migrations: the new pattern. International Migration Review 11(2): 232–240. Summer 1977.

•304. KEELY, C.B. Managing migration for development. In: Population Council. Program for West Asia and North Africa. Report on the Study Group on Worker Migration Abroad. Amman, December 2–3, 1978. Cairo, Population Council, [1978]. (Regional Papers of the Population Council's Program for West Asia and North Africa) p. 1–19.

305. KEELY, C.B. The shadows of invisible people. American Demographics, March 1980. p. 24–29.

•306. KELLY, C.B. and ELWELL, P.J. Global refugee policy: the case for a development-oriented strategy. New York, Population Council, 1981. (Public Issues Paper of the Population Council No. PI-05) 65 p.

307. KELLY, J.J. Possible approaches to improving the international comparability of immigration and emigration statistics: an illustration of the Canadian situation. International Migration Review 16(3): 619–634. Fall 1982.

308. KENNEDY, R.E., Jr. The Irish: emigration, marriage, and fertility. Berkeley, University of California Press, 1973. 236 p.

309. KENYA. CENTRAL BUREAU OF STATISTICS. MINISTRY OF ECONOMIC PLANNING AND DEVELOPMENT. Kenya fertility survey, 1977–1978. First report. Vol. 1. Nairobi, Central Bureau of Statistics, Ministry of Economic Planning and Development, February 1980. (World Fertility Survey) 757 p.

*310. KEYFITZ, N. Migration as a means of population control. Population Studies 25(1): 63–72. March 1971.

311. KHAFAGY, F.A. Socio economic impact of emigration from El-Quebabat village. Population Studies Quarterly Review, No. 61, April–June 1982. p. 39–45.

312. KIM, D.Y. and SLOBODA, J.E. Migration and Korean development. In: Repetto, R., Kwon, T.H., Kim, S.-U., Kim, D.Y., Sloboda, J.E., and Donaldson, P.J. Economic development, population policy, and demographic transition in the Republic of Korea. Cambridge, Massachusetts, Harvard Univeristy Press, 1981. p. 36–138.

313. KIM, H.-K. Social factors of migration from rural to urban areas with special reference to developing countries: the case of Korea. Social Indicators Research 10(1): 29–74. 1981.

314. KIM, K.-D. and LEE, O.-J. Adaptation to the city and return home in the Republic of Korea. International Social Science Journal 31(2): 263–272. 1979.

315. KING, J. Interstate migration in Mexico. Economic Development and Cultural Change 27(1): 83–101. October 1978.

316. KIRWAN, F.X. The impact of labor migration on the Jordanian economy. International Migration Review 15(4): 671–695. Winter 1981.

317. KLIJZING, F.K.H. and EBANKS, G.E. El Salvador: algunos factores relacionados con la fecundidad. [El Salvador: factors related to fertility.] [SPA] San José, Costa Rica, Centro Latinoamericano de Demografía, November 1977. (Series A, No. 1035) 95 p.

318. KNODEL, J. and DEBAVALYA, N. Breastfeeding in Thailand: trends and differentials, 1969–79. Studies in Family Planning 2(12): 355–377. December 1980.

*319. KNOWLES, J.C. and ANKER, R. An analysis of income transfers in a developing country: the case of Kenya. Journal of Development Economics 8(2): 205–226. April 1981.

*320. KNOWLES, J.C. and ANKER, R. The determinants of internal migration in Kenya: a district level analysis. Geneva, International Labour Office, October 1977. (World Employment Programme, Population and Employment Working Paper No. 56) 27 p.

321. KONE, S. In the footsteps of the pioneers. IDRC Reports 11(2): 10. July 1982.

322. KOREA. ECONOMIC PLANNING BOARD. NATIONAL BUREAU OF STATISTICS. and KOREAN INSTITUTE FOR FAMILY PLANNING. The Korean national fertility survey. First country report, 1974. Seoul, National Bureau of Statistics, December 1977. (World Fertility Survey) 863 p.

*323. KRAUSSE, G. Economic adjustment of migrants in the city: the Jakarta experience. International Migration Review 13(1): 46–70. Spring 1979.

*324. KRITZ, M.M., KEELY, C.B., and TOMASI, S.M., eds. Global trends in migration: theory and research on international population movements. Staten Island, New York, Center for Migration Studies of New York, 1981. 433 p.

325. KUBAT, D. Immigration policy in France: recent developments. Presented at the 52nd Annual Meeting of the Population Association of America, Pittsburgh, Pennsylvania, April 13–16, 1983. 25 p.

326. KUBAT, D. Introduction. In: Kubat, D., Mehrländer, U., and Gehmacher, E., eds. The politics of migration policies: the First World in the 1970s. New York, Center for Migration Studies, 1979. p. xvii–xxx.

327. KUBAT, D. Turkey. In: Kubat, D., Mehrländer, U., and Gehmacher, E., eds. The politics of migration policies: the First World in the 1970s. New York, Center for Migration Studies, 1979, p. 247–257.

*328. KUBAT, D., MEHRLÄNDER, U., and GEHMACHER, E., eds. The politics of migration policies: the First World in the 1970s. New York, Center for Migration Studies, 1979. 294 p.

329. KUBOTA, J. and MATSUDA, K.J. Family planning services for Southeast Asian refugees. Family and Community Health, May 1982. p. 19–28.

330. KURIAN, R. and THAKORE, D. Gulf money in Kerala: coping with the problems of plenty. Business India, No. 34, June 25–July 8, 1979. p. 20, 23, 25.

*331. KUZNETS, S. Introduction: population redistribution, migration, and economic growth. In: Eldridge, H.T. and Thomas, D.S., eds. Demographic analyses and interpretation. Vol. 3. Population redistribution and economic growth: United States, 1870–1950. Philadelphia, American Philosophical Society, 1964. p. xxiii–xxxv.

332. LAITE, J. Industrial development and migrant labour in Latin America. Austin, University of Texas Press, 1981. 229 p.

333. LAQUIAN, A.A. Slums are for people. Honolulu, Hawaii, East-West Center Press, 1969. 245 p.

334. LAQUIAN, A.A. Review and evaluation of urban accommodationist policies in population redistribution. In: United Nations (UN). Department of International Economic and Social Affairs. Population distribution policies in development planning. New York, UN, 1981. p. 101–112.

335. LAQUIAN, A.A. Slums and squatters in South and Southeast Asia. In: Jakobson, L., Prakash, V., and Jakobson, S.O., eds. Urbanization and national development. Beverly Hills, California, Sage, 1971. (South and Southeast Asia Urban Affairs Annuals Vol. 1) p. 183–203.

*336. LAQUIAN, A.A. and SIMMONS, A.B. Public policy and migratory behavior in selected cities. In: White, J.W., ed. The urban impact of internal migration. Chapel Hill, University of North Carolina, Institute for Research in Social Science, 1979. (Comparative Urban Studies Project Monograph No. 5) p. 97–124.

337. LAUWAGIE, B.N. The effects of rural modernization on migration patterns: the case of Mexico. [Doctoral dissertation, Stanford University, 1980] Ann Arbor, Michigan, University Microfilms, 1983. (No. 8024694) 163 p.

338. LEBON, A. Le comportement de transfert de fonds des travailleurs immigrés. [Patterns of the transfer of funds by immigrant workers.][FRE] Revue Française des Affaires Sociales 32(Special issue): 81–108. April–June 1978.

339. LEBON, A. The impact of migrants, especially second-generation migrants, on the demographic situation in selected countries of employment. Geneva, International Labour Office, September 1981. (RER/79/001/DOC-2(e)) 49 p.

340. LEBON, A. Return migration from France. Presented at the First European Conference on International Return Migration, Rome, November 11–14, 1981. 46 p.

*341. LEE, B.S., EDLEFSEN, L.E., KARELS, G.V., and GARCIA, F. The influence of rural-urban migration on the fertility of migrants in developing countries: analysis of Mexican data. (Prepared for the United States Agency for International Development) Mexico City, Academia Mexicana de Investigación en Demografía Médica, A.C., July 1983. (Contract No. AID/OTR-5412-C-00-1205-00) 372 p.

*342. LEE, B.S., FARBER, S.C., JAMAL, A.M.M., and RULISON, M.V.E. The influence of rural-urban migration on the fertility of migrants in developing countries: analysis of Korean data. Baton Rouge, Louisiana State University and Research Triangle Institute, 1981. 490 p.

*343. LEE, E.S. A theory of migration. Demography 3(1): 47–57. 1966.

344. LEHMANN, D. Agrarian structure, migration and the state in Cuba. In: Peek, P. and Standing, G., eds. State policies and migration: studies in Latin America and the Caribbean. London, Croom Helm, 1982. p. 321–387.

345. LESTHAEGHE, R., PAGE, H.J., and ADEGBOLA, O. Child-spacing and fertility in Lagos. In: Page, H.J. and Lesthaeghe, R., eds. Child-spacing in tropical Africa: traditions and change. London, Academic Press, 1981. p. 147–179.

346. LEVY, M.B. and WADYCKI, W.J. Education and the decision to migrate: an econometric analysis of migration in Venezuela. Econometrica 42(2): 377–388. March 1974.

347. LEWIS, W.A. Economic development with unlimited supplies of labour. Manchester School of Economic and Social Studies 22(2): 139–191. May 1954.

348. LIANOS, T.P. Greece. In: Kubat, D., Mehrländer, U., and Gehmacher, E., eds. The politics of migration policies: the First World in the 1970s. New York, Center for Migration Studies, 1979. p. 209–218.

349. LIEBERMAN, S.S. Accommodation and control of population growth: some demographic perspectives on Pakistan's development. New York, Population Council, 1981. (Center for Policy Studies Working Papers No. 76) 76 p.

350. LIEBERMAN, S.S. and GITMEZ, A.S. Turkey. In: Krane, R.E., ed. International labor migration in Europe. New York, Praeger, 1979. p. 201–220.

351. LIERDEMAN, J.L. Pointe-Noire: évolution d'un modele de croissance démographique urbaine (1958–1970). [Pointe-Noire: development of a model of urban demographic growth (1958–1970).][FRE, summary in ENG] In: La croissance urbaine en Afrique noire et à Madagascar, Tome 2. Paris, Editions du Centre National de la Recherche Scientifique, 1972. p. 785–802.

352. LIGHTBOURNE, R.E. Urban-rural differentials in contraceptive use. Voorburg, Netherlands, International Statistical Institute, May 1980. (World Fertility Survey Comparative Studies-Cross National Summaries No. 10) 75 p.

353. LIM, L.L. Labour shortages in the rural agricultural sector: a search for explanations and solutions. Kuala Lumpur, Malaysia, University of Malaya, Population Studies Unit, February 1981. (Discussion Paper No. 1) 31 p.

354. LINKE, W. The demographic characteristics and the marriage and fertility patterns of migrant populations: an assessment of their role in the future demographic development of countries of origin and destination. Strasbourg, France, Council of Europe, 1976. (Population Studies No. 1) 66 p.

*355. LINN, J.F. The costs of urbanization in developing countries. Economic Development and Cultural Change 30(3): 625–648. April 1982.

*356. LIPTON, M. Migration from rural areas of poor countries: the impact on rural productivity and income distribution. In: Sabot, R.H., ed. Migration and the labor market in developing countries. Boulder, Colorado, Westview Press, 1982. p. 191–228.

*357. LIPTON, M. Why poor people stay poor: urban bias in developing countries. London, Temple Smith, 1977. 467 p.

358. LO, F.-C. and SALIH, K. Growth poles and regional policy in open dualistic economies: Western theory and Asian reality. In: Lo, F.-C. and Salih, K., eds. Growth pole strategy and regional development policy: Asian experience and alternative approaches. Oxford, Pergamon Press, 1978. p. 243–269.

359. LOBO, S. A house of my own: social organization in the squatter settlements of Lima, Peru. Tucson, University of Arizona Press, 1982. 190 p.

360. LOCHER, U. Rural-urban migration and the alleged demise of the extended family: the Haitian case in comparative perspective. Montreal, Canada, Centre for Developing-Area Studies, August 1977. (Working Paper No. 20) 14 p.

361. LOMNITZ, L. Mecanismos de articulación entre el sector informal y el sector formal urbano. [Mechanisms of articulation between the informal and the formal urban sectors.] [SPA] Sociologia 40(1): 131–153. January–March 1978.

*362. LOMNITZ, L. The survival of the unfittest. In: Schaedel, R.P., Hardoy, J.E., and Kinzer, N.S., eds. Urbanization in the Americas from its beginnings to the present. The Hague, Netherlands, Mouton, 1978. p. 536–568.

363. LONG, L.H. and DE ARE, D. Migration to nonmetropolitan areas: appraising the trend and reasons for moving. [Washington, D.C.], U.S. Department of Commerce, Bureau of the Census, November 1980. (Special Demographic Analyses No. CDS 80–2) 29 p.

364. LUBELL, H. Urban development and employment: the Third World metropolis. International Labour Review 117(6): 747–756. November–December 1978.

*365. MABOGUNJE, A.L. Migrants and innovation in African societies: definition of a research field. African Urban Notes (Series B, No. 1): 49–59. Winter 1974–1975.

366. MABOGUNJE, A.L. Migration and urbanization. In: Caldwell, J.C., ed. Population growth and socioeconomic change in West Africa. New York, Columbia University Press, 1975. p. 153–168.

367. MABOGUNJE, A.L. Objectives and rationales for regional population redistribution in developing countries. In: United Nations (UN). Department of International Economic and Social Affairs. Population distribution policies in development planning. New York, UN, 1981. p. 19–29.

368. MABOGUNJE, A.L. Systems approach to a theory of rural-urban migration. Geographical Analysis 2(1): 1–18. January 1970.

369. MABOGUNJE, A.L. and AROWOLO, O. Social science research on population and development in Africa south of the Sahara. Appendix 7. Mexico City, International Review Group of Social Science Research on Population and Development, El Colegio de México, December 1978. 55 p.

370. MACISCO, J.J., Jr., BOUVIER, L.F., and WELLER, R.H. The effect of labor force participation on the relation between migration status and fertility in San Juan, Puerto Rico. Milbank Memorial Fund Quarterly 48(1): 51–70. January 1970.

371. MAGGS, P.B. and LEE, L.T. North African migrants under Western European law. Medford, Massachusetts, Tufts University, Fletcher School of Law and Diplomacy, 1976. (Law and Population Monograph Series No. 37) 26 p.

372. MAHMUD, W. and OSMANI, S.R. Impact of emigrant workers' remittances on the Bangladesh economy. Bangladesh Development Studies 8(3): 1–28. Monsoon 1980.

373. MAINE, D. Family planning: its impact on the health of women and children. New York, Columbia University, Center for Population and Family Health, 1981. (AID/DSPE-CA-0043) 56 p.

374. MAJAVA, A. The Scandinavian countries: Denmark, Finland, Norway, Sweden. In: Kubat, D., Mehrländer, U., and Gehmacher, E., eds. The politics of migration policies: the First World in the 1970s. New York, Center for Migration Studies, 1979. p 163–191.

375. MAKINWA, P.K. Migration-induced urban settlement patterns in Nigeria. In: Chojnacka, H., Olusanya, P.O., and Ojo, F., eds. Population and economic development in Nigeria in the nineteen eighties. (Proceedings of a National Workshop held at the University of Lagos, September 12–14, 1979) New York, United Nations Department of Technical Cooperation for Development, 1981. (TCD/SEM.81/2) p. 158–173.

376. MALLOY, J.M. Peru's troubled return to democratic government. Hanover, New Hampshire, Universities Field Staff International, 1982. (UFSI Reports, No. 15, South America.) 11 p.

*377. MANGIN, W. Latin American squatter settlements: a problem and a solution. Latin American Research Review 2(3): 65–98. Summer 1967.

378. MANTRA, I.B. Population movement in wet rice communities: a case study of two dukuh in Yogyakarta Special Region. Doctoral dissertation, [University of Hawaii], Honolulu, Hawaii, 1978. 363 p.

379. MARINO, A. Family, fertility, and sex ratios in the British Caribbean. Population Studies 24(2): 159–172. July 1970.

380. MARSH, N.R., GEAR, A.E., MCDONALD, W.F., JONES, J., and PERRING, C. Migration and employment in the South Pacific. Presented at the South Pacific Sub-Regional Seminar on Population, Employment and Development, Suva, Fiji, April 23–25, 1979. 72 p.

381. MARSHALL, A. Structural trends in international labor migration: the Southern Cone of Latin America. In: Kritz, M.M., Keely, C.B., and Tomasi, S.M., eds. Global trends in migration: theory and research on international population movements. Staten Island, Center for Migration Studies of New York, 1981. p. 234–258.

382. MARTIN, P.L. and SEHGAL, E.B. Illegal immigration: the guestworker option. Public Policy 28(2): 207–229. Spring 1980.

383. MARTINE, G. Adaptation of migrants or survival of the fittest? A Brazilian case. Journal of Developing Areas 14(1): 23–41. 1979.

384. MARTINE, G. Colonisation in Rondonia: continuities and perspectives. In: Peek, P. and Standing, G., eds. State policies and migration: studies in Latin America and the Caribbean. London, Croom Helm, 1982. p. 147–172.

385. MARTINE, G. Migrant fertility adjustment and urban growth in Latin America. [ENG, summary in FRE] In: International Union for the Scientific Study of Population (IUSSP). International Population Conference, Vol. 1, Liege, 1973. Liège, Belgium, IUSSP, 1973. p. 293–304.

386. MASSEY, D.S. and MULLAN, B.P. A demonstration of the effect of seasonal migration on fertility. Philadelphia, University of Pennsylvania, Population Studies Center, April 1983. 45 p.

387. MATOS MAR, J. and MANUEL MEJIA, J. Casual work, seasonal migration and agrarian reform in Peru. In: Peek, P. and Standing, G., eds. State policies and migration: studies in Latin America and the Caribbean. London, Croom Helm, 1982. p. 81–119.

388. MAULDIN, W.P., BERELSON, B., and SYKES, Z. Condi-

tions of fertility decline in developing countries, 1965–75. Studies in Family Planning 9(5): 89–145. May 1978.

389. MCARTHUR, H.J., Jr. The effects of overseas work on return migrants and their home communities: a Philippine case. Papers in Anthropology 20(1): 85–104. Spring 1979.

390. MCCUTCHEON, L. Occupation and housing adjustment of migrants to Surabaya, Indonesia: the case of a second city. International Migration Review 12(1): 82–92. Spring 1978.

391. MCGEE, T.G. The urbanization process in the Third World: explorations in search of a theory. London, G. Bell and Sons, 1971. 179 p.

392. MCGRAW, E. FPA Hong Kong extends services to refugees. In: United Nations. Economic and Social Commission for Asia and the Pacific (ESCAP). Inventory of selected local family planning programme experiences in countries of the ESCAP region. Vol. 3. Bangkok, ESCAP, 1981. (ST/ESCAP/107) p. 41–42.

393. MCGREEVEY, W.P. A statistical analysis of primacy and lognormality in the size distribution of Latin American cities, 1750–1960. In: Morse, R.M., Conniff, M.L., and Wibel, J., eds. The urban development of Latin America: 1750–1920. Stanford, California, Stanford University Center for Latin American Studies, 1971. p. 116–129.

394. MCLIN, J. International migrations and the European community. Fieldstaff Reports 7(1): 1–12. (West Europe Series) December 1971.

395. MEHRLÄNDER, U. Federal Republic of Germany. In: Kubat, D., Mehrländer, U., and Gehmacher, E., eds. The politics of migration policies: the First World in the 1970s. New York, Center for Migration Studies, 1979. p. 146–162.

396. MEHTA, S.K. Some demographic and economic correlates of primate cities: a case for revaluation. In: Breese, G.W., ed. The city in newly developing countries: readings on urbanism and urbanization. Englewood Cliffs, New Jersey, Prentice-Hall, 1969. p. 295–308.

397. MENDONSA, E.L. Benefits of migration as a personal strategy in Nazaré, Portugal. International Migration Review 16(3): 635–645. Fall 1982.

398. MERA, K. The changing pattern of population distribution in Japan and its implications for developing countries. In: Lo, F.-C. and Salih, K., eds. Growth pole strategy and regional development policy: Asian experience and alternative approaches. Oxford, Pergamon Press, 1978. p. 193–215.

399. MERA, K. Population concentration and regional income disparities: a comparative analysis of Japan and Korea. In: Hansen, N.M., ed. Human settlement systems: international perspectives on structure, change and public policy. Cambridge, Massachusetts, Ballinger, 1978. p. 155–175.

*400. MERA, K. Population distribution policies: the need for caution. In: United Nations (UN). Department of International Economic and Social Affairs. Population distribution policies in development planning. New York, UN, 1981. p. 33–41.

401. MERNISSI, F. Obstacles to family planning practice in urban Morocco. Studies in Family Planning 6(12): 418–425. December 1975.

402. MERRICK, T.W. Interregional differences in fertility in Brazil, 1950–1970. Demography 11(3): 423–440. August 1974.

403. MILLER, M.J. Reluctant partnership: foreign workers in Franco-Algerian relations, 1962–1979. Journal of International Affairs 33(2): 219–237. Fall-Winter 1979.

404. MILLS, E.S. Government programs to control sizes of large cities. [Washington, D.C.], World Bank and Princeton University, 1982. 18 p. (Mimeo)

405. MIRACLE, M.P. and BERRY, S.S. Migrant labour and economic development. Oxford Economic Papers 22(1): 86–108. March 1970.

406. MONSTED, M. The population implications of rural development in Kenya. In: Uche, U.U., ed. Law and population change in Africa. Nairobi, East African Literature Bureau, 1976. (Law and Population Book Series No. 12) p. 209–219.

407. MOON, H.S. [Urbanization and fertility reduction in Korea.] [KOR, summary in ENG] Journal of Family Planning Studies 7: 7–23. November 1980.

408. MOORE, R.J. Urban problems and policy responses for metropolitan Guayaquil. In: Cornelius, W.A. and Kemper, R.V., eds. Latin American urban research, Vol. 6. Metropolitan Latin America: the challenge and the response. Beverly Hills, California, Sage, 1978. p. 181–203.

409. MORGAN, R.W. Migration into Lagos, Nigeria. In: Udo, R.K., ed. Population education source book for sub-Saharan Africa. Nairobi, Heinemann, 1979. p. 256–270.

410. MORRIS, L., LEWIS, G., POWELL, D.L., ANDERSON, J., WAY, A., CUSHING, J., and LAWLESS, G. Contraceptive Prevalence Surveys: a new source of family planning data. Population Reports, Series M, No. 5. Baltimore, Johns Hopkins University, Population Information Program, May–June 1981. 40 p.

411. MOULIER, Y. and TAPINOS, G. France. In: Kubat, D., Mehrländer, U., and Gehmacher, E., eds. The politics of migration policies: the First World in the 1970s. New York, Center for Migration Studies, 1979. p. 127–143.

412. MPITI, A.M. Lesotho's population size, structure, distribution and dynamics. Presented at the National Conference on Population Management as a Factor in Development Including Family Planning, Maseru, Lesotho, April 26–29, 1979. 10 p.

413. MUNDLAK, Y. Migración del campo a la ciudad: análisis empírico basado en datos rurales. [Migration from rural areas to the city: an empirical analysis based on rural data.] [SPA, summary in ENG] Cuadernos de Economía 15(45): 143–161. August 1978.

414. MURPHY, E.M. and CANCELLIER, P. Immigration: questions and answers. Washington, D.C., Population Reference Bureau, 1982. 13 p.

*415. MURRAY, C. Families divided: the impact of migrant labour in Lesotho. Cambridge, England, Cambridge University Press, 1981. 219 p.

416. MURTADA MUSTAFA, M. EL. Development planning and international migration in the Sudan. Labour and Society 5(1): 85–98. January 1980.

417. MUWONGE, J.W. Urban policy and patterns of low-income settlement in Nairobi, Kenya. Population and Development Review 6(4): 595–613. December 1980.

418. MWANZA, J.M. Rural-urban migration and urban employment in Zambia. Developing Economies 17(1): 172–181. March 1979.

419. MYERS, D.J. Caracas: the politics of intensifying primacy. In: Cornelius, W.A. and Kemper, R.V., eds. Latin American urban research, Vol. 6. Metropolitan Latin America: the challenge and the response. Beverly Hills, California, Saga, 1978. p. 227–258.

420. MYNTTI, C. The effects of breastfeeding, temporary emigration and contraceptive use on the fertility of the Yemen Arab Republic. Cairo, Population Council, May 1978. 28 p.

421. NABI, I. An empirical analysis of rural-urban migration in less developed economies. Economics Letters 8(2): 193–199. 1981.

422. NAG, M. How modernization can also increase fertility. New York, Population Council, November 1979. (Center for Policy Studies Working Paper No. 49) 49 p.

423. NAG, M. Pattern of mating behaviour, emigration and contraceptives as factors affecting human fertility in Barbados. Social and Economic Studies 20(2): 111–113. 1971.

424. NANCE, J. and THOMAS, R.N. Place factor as a fertility differential: a Honduran example. In: Thomas R.N., ed. Population dynamics of Latin America: a review and bibliography. East Lansing, Michigan, CLAG Publications, 1973. p. 115–121.

425. NATIONAL RESEARCH COUNCIL. COMMITTEE ON POPULATION AND DEMOGRAPHY. PANEL ON EGYPT. The estimation of recent trends in fertility and mortality in Egypt. Washington, D.C., National Academy Press, 1982. (National Academy of Sciences, Committee on Population and Demography Report No. 9) 144 p.

426. NELSON, J. Access to power: politics and the urban poor in developing nations. Princeton, New Jersey, Princeton University Press, 1979. 463 p.

427. NELSON, J.M. Population redistribution policies and migrants' choices. In: Morrison, P.A., ed. Population movements: their forms and functions in urbanization and development. Liège, Belgium, Ordina Editions, 1983. p. 281–312.

*428. NELSON, J.M. Sojourners versus new urbanites: causes and consequences of temporary versus permanent cityward migration in developing countries. Economic Development and Cultural Change 24(1): 721–757. October 1975.

429. NELSON, R.R., SCHULTZ, T.P., and SLIGHTON, R.L. Internal migration: a quantitative study of rural-urban migration in Colombia. In: Structural change in a developing economy: Colombia's problems and prospects. Princeton, New Jersey, Princeton University Press, 1971. p. 45–76.

430. NEWLAND, K. International migration: the search for work. Washington, D.C., Worldwatch Institute, November 1979. (Worldwatch Paper 33) 31 p.

431. NEWLAND, K. Refugees: the new international politics of displacement. Washington, D.C., Worldwatch Institute, March 1981. (Worldwatch Paper 43) 35 p.

432. NOOR, N.M. Dimensions of the demographic and redistributional consequences of the FELDA land development programme in Malaysia. In: Regional Organization for Inter Governmental Cooperation and Coordination (IGCC) in Population and Family Planning in South East Asia. Seminar on the effect on internal migration, urbanization and resettlement in the IGCC region on its population/family planning programmes, Jakarta, Indonesia, March 18–20, 1980. Kuala Lumpur, Malaysia, IGCC, 1980. (Paper No. 15) p. 116–123.

433. NOORDAM, J. La fecundidad de las mujeres migrantes y nativas de Asunción en relación con las oportunidades de trabajo. [The fertility of female migrants and natives of Asunción in relation to job opportunities.] [SPA, summary in ENG] Notas de Población 6(16): 45–69. April 1978.

434. NOR BIN ABDUL GHANI, M. Discouraging rural to urban migration of the youths in Malaysia. Development Forum 9(2): 61–70. December 1979.

435. NORTH, D.S. Amnesty: conferring legal status on illegal immigrants. Washington, D.C., New TransCentury Foundation, Center for Labor and Migration Studies, December 1980. 135 p.

436. NORTH, D.S. and WAGNER, J.R. Illegal migrants in northern America. [ENG, summary in FRE] In: International Population Conference. Vol. 2. (Papers of the 19th General Conference of the International Union for the Scientific Study of Population) Liège, Belgium, Ordina Editions, [1981]. p. 473–489.

437. NORTMAN, D.L. and HOFSTATTER, E. Population and family planning programs: a compendium of data through 1978. 10th ed. New York, Population Council, 1980. (A Population Council Fact Book) 94 p.

438. NOTESTEIN, F.W. Population: the long view. In: Schultz, T.W., ed. Food for the world. Chicago, University of Chicago Press, 1945. p. 36–57.

439. OBERAI, A.S. Migration, unemployment and the urban labour market: a case study of the Sudan. International Labour Review 115(2): 211–223. March–April 1977.

*440. OBERAI, A.S. State policies and internal migration in Asia. International Labour Review 120(2): 231–244. March–April 1981.

*441. OBERAI, A.S. and SINGH, H.K.M. Migration, production and technology in agriculture: a case study in the Indian Punjab. International Labour Review 121(3): 327–343. May-June 1982.

*442. OBERAI, A.S. and SINGH, H.K.M. Migration, remittances and rural development: findings of a case study in the Indian Punjab. International Labour Review 119(2): 229–241. March–April 1980.

443. OBERAI, A.S. and SINGH, H.K.M. Migration, unemployment and the urban labour market: a case study of Ludhiana in the Indian Punjab. Geneva, International Labour Office, December 1981. (World Employment Programme Research Working Papers, Population and Labour Policies Programme Working Paper No. 113) 99 p.

444. OBERAI, A.S. and SINGH, H.K.M. Migration, urbanisation and fertility: the case of the Indian Punjab. Geneva, International Labour Office, September 1980. (World Employment Programme Research Working Papers, Population and Labour Policies Programme Working Paper No. 95) 54 p.

445. OBERAI, A.S. and SINGH, H.K.M. Urban in-migration and remittances: a case study of Ludhiana in the Indian Punjab. Geneva, International Labour Office, January 1981. (World Employment Programme Research Working Papers, Population and Labour Policies Programme Working Paper No. 97) 39 p.

446. ODELL, P. Emerging themes: towards a new economic geography of Latin America. In: Odell, P.R. and Preston, D.A., eds. Economies and societies in Latin America: a geographical interpretation. Chichester, England, John Wiley & Sons, 1978. p. 218–264.

447. OKOYE, C.S. Migration in Sierra Leone. In: Zachariah, K.C., Condé, J., Nair, N.K., Okoye, C.S., Campbell, E.K., Srivastava, M.L., and Swindell, K. Demographic aspects of migration in West Africa: Vol. 1. Washington, D.C., World Bank, September 1980. (World Bank Staff Working Paper No. 414) p. S.L.1–40.

448. OKOYE, C.S. Population distribution, urbanisation and migration in Sierra Leone: an analysis of the Sierra Leone 1974 population census data. Census analysis vol. 4. Freetown, Sierra Leone, Central Statistics Office, March 1981. 68 p.

449. OMINDE, S.H. Spatial population change: Kenya case study. Geoforum 8(5–6): 231–241. 1977.

450. ORGANISATION FOR ECONOMIC COOPERATION AND DEVELOPMENT (OECD). Economic consequences of migration from North Africa to France. Development Digest 17(4): 102–115. October 1979.

451. ORLANSKY, D. and DUBROVSKY, S. The effects of rural-urban migration on women's role and status in Latin America. Paris, United Nations Educational, Scientific and Cultural Organization (UNESCO), 1978. (UNESCO Report No. 41) 50 p.

*452. PAINE, S. Exporting workers: the Turkish case. London, Cambridge University Press, 1974. 227 p.

453. PAKKASEM, P. Growth and management of the Bangkok metropolis. Presented at Conference on Urbanization and National Development, Honolulu, Hawaii, East-West Population Institute, January 25–29, 1982. 22 p.

454. PAPADEMETRIOU, D.G. European labor migration: consequences for the countries of worker origin. International Studies Quarterly 22(3): 377–408. September 1978.

455. PAPADEMETRIOU, D. Greece. In: Krane, R.E., ed. International labor migration in Europe. New York, Praeger, 1979. p. 187–200.

*456. PAPANEK, G.F. The poor of Jakarta. Economic Development and Cultural Change 24(1): 1–27. October 1975.

457. PARK, J.-Y. and PARK, I.H. Migration and female labor force impact on Korean fertility. In: Smithsonian Institution. Interdisciplinary Communications Program. The dynamics of migration: internal migration and migration and fertility. Washington, D.C., Smithsonian Institution, December 1976. (Occasional Monograph Series No. 5, Vol. 1) p. 267–275.

458. PARLIAMENTARY CONFERENCE ON POPULATION AND DEVELOPMENT IN AFRICA. Population and development in Africa: conclusions and recommendations of the Parliamentary Conference on Population and Development in Africa, Nairobi, 6–9 July 1981. In: United Nations Fund for Population Activities (UNFPA). Parliamentary Conference on Population and Development in Africa. July 29, 1981. 12 p. (Unpublished)

459. PEEK, P. Agrarian change and labour migration in the Sierra of Ecuador. In: Peek, P. and Standing, G., eds. State policies and migration: studies in Latin America and the Caribbean. London, Croom Helm, 1982. p. 121–145.

460. PEEK, P. Urban poverty, migration and land reform in Ecuador. Geneva, International Labour Office, World Employment Programme, March 1980. (Institute of Social Studies Occasional Paper No. 79) 42 p.

461. PEEK, P. and ANTOLINEZ, P. Migration and the urban labour market: the case of San Salvador. World Development 5(4): 291–302. April 1977.

*462. PEEK, P. and STANDING, G. Rural-urban migration and government policies in low-income countries. International Labour Review 118(6): 747–762. November–December 1979.

463. PEEK, P. and STANDING, G. State policies and labour migration. In: Peek, P. and Standing, G., eds. State policies and migration: studies in Latin America and the Caribbean. London, Croom Helm, 1982. p. 1–34.

*464. PEEK, P. and STANDING, G., eds. State policies and migration: studies in Latin America and the Caribbean. London, Croom Helm, 1982. 403 p.

465. PERNIA, E.M. A method of decomposing urban population growth and an application to Philippine data. Honolulu, Hawaii, East-West Center, December 1976. (Papers of the East-West Population Institute No. 41) 26 p.

466. PESSAR, P.R. The role of households in international migration and the case of U.S.-bound migration from the

Dominican Republic. International Migration Review 16(2): 342–364. Summer 1982.

467. PETERSEN, W. A general typology of migration. American Sociological Review 23(3): 256–266. June 1958.

468. PHILPOTT, S.B. The implications of migration for sending societies: some theoretical considerations. In: Spencer, R.F., ed. Migration and anthropology: proceedings of the 1970 Annual Spring Meeting of the American Ethnological Society. Seattle, University of Washington, 1970. p. 9–20.

*469. PIORE, M.J. Birds of passage: migrant labor and industrial societies. Cambridge, England, Cambridge University Press, 1979. 229 p.

470. POPULATION CENTER FOUNDATION (PCF). Population distribution and settlements. In: Survival of humankind: the Philippine experiment. (Prepared for the World Science Conference, Manila, September 6–10, 1976) Manila, PCF, [1976]. p. 9–30.

471. POPULATION COUNCIL. WEST ASIA AND NORTH AFRICA REGIONAL OFFICE. Report on the Study Group on Worker Migration Abroad, Amman, 2nd–3rd December, 1978. Cairo, Population Council, 1979. (Population Council Regional Papers) 40 p.

472. POPULATION CRISIS COMMITTEE. Labor force growth, unemployment and migration. Population, No. 7. September 1977. p. 1–6.

473. PORTES, A. Housing policy, urban poverty, and the state: the favelas of Rio de Janeiro, 1972–1976. Latin American Research Review 14(2): 3–24. 1979.

474. PORTES, A. Modes of structural incorporation and present theories of labor immigration. In: Kritz, M.M., Keely, C.B., and Tomasi, S.M., eds. Global trends in migration: theory and research on international population movements. Staten Island, Center for Migration Studies of New York, 1981. p. 279–297.

475. POTTER, J.E., ORDONEZ G., M. and MEASHAM, A.R. The rapid decline in Colombian fertility. Population and Development Review 2(3–4): 509–528. September/December 1976.

476. POTTS, M. and BHIWANDIWALA, P.P. Meeting the family planning needs of the urban poor. Research Triangle Park, North Carolina, International Fertility Research Program, 1981. 93 p.

477. POULAIN, M. Du registre de population aux statistiques de migration interne en Belgique: critique des sources et correction des données. [From population registers to statistics on internal migration in Belgium: critique of sources and correction of data.] [FRE, summary in ENG] Population et Famille 45(3): 1–45. 1978.

478. PRAKAS [illegible] A. Impact of foreign remittances: a case study of Chavakkad village in Kerala. Economic and Political Weekly 13(27): 1107–1111. July 8, 1978.

479. PREMI, M.K. Aspects of female migration in India. Economic and Political Weekly 15(15): 714–720. April 12, 1980.

480. PRESSWELL, N.J. An approach to family planning for Indochinese refugee women. Australian Family Physician 11(8): 644–648. August 1982.

481. PRESTON, D. Land reform and colonization. In: Odell, P.R. and Preston, D.A., eds. Economies and societies in Latin America: a geographical interpretation. Chichester, England, John Wiley & Sons, 1978. p. 81–108.

482. PRESTON, D.A. Land tenure, rural emigration and rural development in highland Ecuador. Leeds, England, University of Leeds, School of Geography, October 1979. (Working Paper No. 264) 16 p.

483. PRESTON, D.A., TAVERAS, G.A., and PRESTON, R.A. Emigración rural y desarrollo agricola en la sierra ecuatoriana informe final. [Rural emigration and agricultural development in highland Ecuador: final report.][SPA] Leeds, England, University of Leeds, School of Geography, June 1979. (Working Paper No. 238S) 35 p.

*484. PRESTON, S.H. Urban growth in developing countries: a demographic reappraisal. Population and Development Review 5(2): 195–215. June 1979.

485. PRYBYLA, J.S. Hsia-fang: the economics and politics of rustication in China. Pacific Affairs 48(2): 153–172. Summer 1975.

486. PRYOR, R.J. Malaysia: a demographic analysis of internal migrants. In: Migration and development in South-East Asia: a demographic perspective. Kuala Lumpur, Oxford University Press, 1979. p. 98–112.

487. RAHMAN, M., RAHAMAN, M.M., AZIZ, K.M.S., PATWARI, Y., MUNSHI, M.H., and ISLAM, M.S. The people of Teknaf: births, deaths and migrations (1976–1977). Dacca, Bangladesh International Centre for Diarrhoeal Disease Research, May 1979. (Working Paper No. 13) 40 p.

488. RANIS, G. and FEI, J.C.H. A theory of economic development. American Economic Review 51(4): 533–565. September 1961.

489. RAY, T.F. The politics of the barrios of Venezuela. Berkeley, University of California Press, 1969. 211 p.

490. RECCHINI DE LATTES, Z. [United Nations. Population Division] [Population of urban agglomerations: the 1980 UN assessment] Personal communication, July 11, 1983.

491. RELE, J.R. and KANITKAR, T. Residence background and fertility in Greater Bombay. Population Studies 28(2): 299–308. July 1974.

492. REMPEL, H. Maintenance of rural-urban ties. In: Rural-urban labor migration and urban unemployment in Kenya. Laxenburg, Austria, International Institute for Applied Systems Analysis, October 1981. p. 137–153.

*493. REMPEL, H. and LOBDELL, R.A. The role of urban-to-rural remittances in rural development. Journal of Development Studies 14(3): 325–341. April 1978.

494. REMPEL, H. and TODARO, M.P. Rural-to-urban labour migration in Kenya. In: Ominde, S.H. and Ejiogu, C.N., eds. Population growth and economic development in Africa. London, Heinemann, 1972. p. 214-231.

*495. RENAUD, B. National urbanization policy in developing countries. New York, Oxford University Press, 1981. (World Bank Research Publication) 181 p.

496. RENER, C. Fecundidade e migracão rural-urbana no Distrito de São Paulo. [Fecundity and rural-urban migration in the São Paulo District.][POR] In: Berquo, E.S., De Oliveira, M.C.A.F., and De Camargo, C.P.F., eds. A fecundidade em São Paulo: caracteristicas demográficas, biológicas e socioeconômicas. São Paulo, Editora Brasileira de Ciencias, 1977. p. 213–276.

*497. RENGERT, A.C. The process of cityward migration for women and men in Mexico: implications for social development. [Doctoral dissertation, University of Pennsylvania, 1978] Ann Arbor, Michigan, University Microfilms, 1983. (No. 7908785) 306 p.

498. RHOADES, R.E. From caves to Main Street: return migration and the transformation of a Spanish village. Papers in Anthropology 20(1): 57–74. Spring 1979.

499. RHODA, R.E. Development activities and rural-urban migration: is it possible to keep them down on the farm? Washington, D.C., U.S. Agency for International Development, March 1979. 78 p.

*500. RHODA, R. Rural development and urban migration: can we keep them down on the farm? International Migration Review 17(1): 34–64. Spring 1983.

501. RIBE, H. and SCHULTZ, T.P. Migrant and native fertility in Colombia: evidence of selectivity from the 1973 census. New Haven, Connecticut, Yale University, March 1980. 62 p. (Mimeo)

*502. RICHARDSON, H.W. City size and national spatial strategies in developing countries. [Washington, D.C.], World Bank, April 1977. (World Bank Staff Working Paper No. 252) 87 p.

503. RICHARDSON, H.W. Defining urban population distribution goals in development planning. In: United Nations (UN). Department of International Economic and Social Affairs. Population distribution policies in development planning. New York, UN, 1981. p. 7–18.

*504. RICHARDSON, H.W. Population distribution policies. (Prepared for Expert Group Meeting on Population Distribution, Migration and Development, Hammamet, Tunisia, March 21–25, 1983) [New York, UN], December 1982. (IESA/P/ICP.1984/EG.II/7) 26 p.

505. RIDDELL, J.B. African migration and regional disparities. In: Thomas, R.N. and Hunter, J.M., eds. Internal migration systems in the developing world with special reference to Latin America. Boston, G.K. Hall, 1980. p. 114–134.

506. RIDDELL, J.B. The migration to the cities of West Africa: some policy considerations. Journal of Modern African Studies 16(2): 241–260. June 1978.

507. RIST, R.C. The European Economic Community (EEC) and manpower migrations: policies and prospects. Journal of International Affairs 33(2): 201–218. Fall-Winter 1979.

508. RIST, R.C. Migration and marginality: guestworkers in Germany and France. Daedalus: 95–108. Spring 1979.

509. RITCHEY, P.N. Explanations of migration. In: Inkeles, A., Coleman, J., and Smelser, N., eds. Annual review of sociology. Palo Alto, California, Annual Reviews, 1976. p. 363–404.

510. RITCHEY, P.N. and STOKES, C.S. Residence background, migration, and fertility. Demography 9(2): 217–230. May 1972.

511. RO, K.-K. Migration and fertility in Korea. In: Smithsonian Institution. Interdisciplinary Communications Program. The dynamics of migration: internal migration and migration and fertility. Washington, D.C., Smithsonian Institution, December 1976. (Occasional Monograph Series No. 5, Vol. 1) p. 259–266.

*512. ROBERTS, K.D. Agrarian structure and labor mobility in rural Mexico. Population and Development Review 8(2): 299–322. June 1982.

513. ROBINSON, J.G. Estimating the approximate size of the illegal alien population in the United States by the comparative trend analysis of age-specific death rates. Demography 17(2): 159–176. May 1980.

514. ROBIROSA, M.C. and WAINSTEIN, M. Urbanización y salud. [Urbanization and health.][SPA] Bogotá, Colombia, Federación Panamericana de Asociaciones de Facultades de Medicina, July 1974. (Enseñanza de la Demografiá en las Facultades de Medicina No. 5) 149 p., 24 slides.

515. ROCHA TRINDADE, M.B. The Iberian Peninsula. In: Kubat, D., Mehrländer, U., and Gehmacher, E., eds. The politics of migration policies: the First World in the 1970s. New York, Center for Migration Studies, 1979. p. 220–231.

*516. RODGERS, G. Migration and income distribution. Geneva, International Labour Office, July 1981. (World Employment Programme Research. Population and Labour Policies Programme Working Paper No. 108; WEP 2-21/WP.108) 39 p.

517. RODWIN, L. National planning of an urban growth region: the experience of Venezuela. In: Nations and cities: a comparison of strategies for urban growth. Boston, Houghton Mifflin, 1970. p. 32–69.

518. ROGERS, A. Sources of urban population growth and urbanization, 1950–2000: a demographic accounting. Economic Development and Cultural Change 30(3): 483–506. April 1982.

519. ROGERS, A. and CASTRO, L.J. Age patterns of migration: cause-specific profiles. In: Rogers, A., ed. Advances in multiregional demography. Laxenburg, Austria, International Institute for Applied Systems Analysis, May 1981. (RR-81-6) p. 125–159.

520. ROGERS, R. Incentives to return: patterns of policies and migrants' responses. In: Kritz, M.M., Keely, C.B., and Tomasi, S.M., eds. Global trends in migration: theory and research on international population movements. Staten Island, Center for Migration Studies of New York, 1981. p. 338–364.

521. ROMANIUK, A. Increase in natural fertility during the early stages of modernization: evidence from an African case study, Zaire. Population Studies 34(2): 293–310. July 1980.

522. ROMANOS, M.C. Forsaken farms: the village-to-city movement in Europe. In: Western European cities in crisis. Lexington, Massachusetts, Lexington Books, 1979. p. 3–19.

523. RUBENSTEIN, H. The return ideology in West Indian migration. Papers in Anthropology 20(1): 21–38. Spring 1979.

524. RUPP, S. Die Familien der Ausländer in der Bundesrepublik Deutschland: Versuch eines neueren Uberblicks. [The families of foreigners in the Federal Republic of Germany: attempting a new overview.][GER, summary in ENG, FRE] Zeitschrift für Bevolkerungswissenschaft 6(1): 85–100. 1980.

525. SABAGH, G. and YIM, [illegible]B. The relationship between migration and fertility in an historical context: the case of Morocco in the 1960s. International Migration Review 14(4): 525–538. Winter 1980.

526. SABOT, R.H., TAYLOR, L., and BOUTROS-GHALI, Y. Labor force growth, employment and earnings in Egypt: 1966–1986. Washington, D.C., World Bank, 1981. 41 p.

527. SAFILIOS-ROTHSCHILD, C. The persistence of women's invisibility in agriculture: theoretical and policy lessons from Lesotho and Sierra Leone. New York, Population Council, September 1982. (Center for Policy Studies Working Paper No. 88) 31 p.

528. SAHOTA, G.S. An economic analysis of internal migration in Brazil. Journal of Political Economy 76(2): 218–245. March–April 1968.

529. SAINT, W.S. and GOLDSMITH, W.W. Cropping systems, structural change and rural-urban migration in Brazil. World Development 8(3): 259–272. March 1980.

*530. SALISBURY, R.F. and SALISBURY, M.E. The rural-oriented strategy of urban adaptation: Siane migrants in Port Moresby. In: Weaver, T. and White, D., eds. The anthropology of urban environments. Washington, D.C., Society for Applied Anthropology, 1972. p. 59–68.

531. SAMHA, M. Migration of refugees and non-refugees to Amman, 1948–1977. Population Bulletin of ECWA, No. 19, December 1980. p. 47–67.

532. SAMMAN, M.L. Les migrations internationales récentes: quelques aspects de l'impact de l'immigration dans le pays d'accueil (cas de la France). [Recent international migration: aspects of the impact of immigration on the host country (the example of France).][FRE] Revue Française des Affaires Sociales 32(Special issue): 19–39. April–June 1978.

533. SAMUEL, M. Le prolétariat africain noir en France. [The Black African proletariat in France.][FRE] Paris, Editions François Maspero, 1978. 262 p.

534. SANDERS, T.G. Brazilian population in 1982: growth, migration, race, religion. Hanover, New Hampshire, Universities Field Staff International, 1982. (UFSI Reports, No. 42.) 15 p.

535. SARKAR, B.N. Studies on migration from rural areas of Bengal. Calcutta, Indian Statistical Institute, Demography Research Unit, February 1982. (DRU Publication No. 34) 20 p.

536. SASSEN-KOOB, S. Economic growth and immigration in Venezuela. International Migration Review 13(3): 455–474. Fall 1979.

537. SAXENA, D.P. Rururban migration in India: causes and consequences. Bombay, Popular Prakashan, 1977. 225 p.

538. SCHMIDA, L.C. The local level effects of labor out-migration in the labor-exporting countries of the Middle East: an analysis of current information and areas for further research. [Washington, D.C.], U.S. Agency for International Development, April 1, 1982. (NEB-035-0-00-1075-00) 100 p.

539. SCHUH, G.E. Out-migration, rural productivity, and the distribution of income. In: Sabot, R.H., ed. Migration and the labor market in developing countries. Boulder, Colorado, Westview Press, 1982. p. 161–190.

540. SCHULTZ, T.P. Migrant behavior and the effects of regional prices: aspects of migrant selection in Colombia. Presented at the 52nd Annual Meeting of the Population Association of America, Pittsburgh, Pennsylvania, April 14–16, 1983. 27 p.

541. SCHULTZ, T.P. Rural-urban migration in Colombia. Review of Economics and Statistics 53: 157–163. May 1971.

542. SCRIMSHAW, S.C. Families to the city: a study of changing values, fertility and socioeconomic status among urban in-migrants. Presented at the 9th International Congress of Anthropological and Ethnological Sciences, Chicago, August–September 1973. 39 p. (Mimeo)

543. SEDDON, D. Labour migration and agricultural development in northeast Morocco: 1870–1970 (Pt.1). Maghreb Review 4(3): 69–77. May-June 1979.

544. SEIF EL NASR, A. Policy analysis and population distribution strategy: an outline for debate. Population Studies 9(63): 3–15. October–December 1982.

545. SHAH, I.H. Breastfeeding and fertility in Pakistan. (World Fertility Survey Conference, London, July 7–11, Substantive Findings Session No. 9, Background Paper No. 5) Voorburg, Netherlands, International Statistical Institute, 1980. (World Fertility Survey) 72 p.

546. SHAKHS, S. EL-. Development, primacy, and systems of cities. Journal of Developing Areas 7(1): 11–36. October 1972.

547. SHAW, R.P. Bending the urban flow: a construction-migration strategy. International Labour Review 119(4): 467–480. July–August 1980.

548. SHAW, R.P. Migration and employment in the Arab world: construction as a key policy variable. International Labour Review 118(5): 589–605. September–October 1979.

549. SHRYOCK, H.S. and SIEGEL, J.S. The methods and materials of demography. 2 vols. Washington, D.C. U.S. Government Printing Office, June 1980. 888 p.

*550. SILVERS, A. and CROSSON, P. Rural development and urban-bound migration in Mexico. Washington, D.C., Resources for the Future, 1980. (Research Paper No. R–17) 150 p.

*551. SIMKINS, P.D. and WERNSTEDT, F.L. Philippine migration: the settlement of the Digos-Padada Valley, Davao Province. New Haven, Connecticut, Yale University, Southeast Asia Studies, 1971. (Monograph Series No. 16) 147 p.

*552. SIMMONS, A.B. Migration and rural development: conceptual approaches, research findings and policy issues. (Prepared for Expert Group Meeting on Population Distribution, Migration and Development, Hammamet, Tunisia, March 21–25, 1983) [New York, UN], January 14, 1983. (IESA/P/ICP.1984/EG.II/9) 59 p.

553. SIMMONS, A.B. A review and evaluation of attempts to constrain migration to selected urban centres and regions. In: United Nations (UN). Department of International Economic and Social Affairs. Population distribution policies in develoment planning. New York, UN, 1981. (Population Studies No. 75) p. 87–100.

554. SIMMONS, A.B. Rural development and population retention: China and Cuba. Presented at the Annual Meeting of the Population Association of America, Pittsburgh, Pennsylvania, May 14–16, 1983. 35 p.

*555. SIMMONS, A.B. Slowing metropolitan city growth in Asia: policies, programs, and results. Population and Development Review 5(1): 87–104. March 1979.

556. SIMMONS, A.B. and CARDONA, R. Rural-urban migration: who comes, who stays, who returns? The case of Bogota, Colombia, 1929–1968. International Migration Review 6(2): 166–181. Summer 1972.

*557. SIMMONS, A.B., DIAZ-BRIQUETS, S., and LAQUIAN, A.A. Social change and internal migration: a review of research findings from Africa, Asia, and Latin America. Ottawa, Canada, International Development Research Centre, 1977. 128 p.

558. SIMMONS, A. and VLASSOFF, C. Industrialisation and urbanisation in Colombia. In: Peek, P. and Standing, G., eds. State policies and migration: studies in Latin America and the Caribbean. London, Croom Helm, 1982. p. 207–249.

559. SINCLAIR, S.W. Urbanization and labor markets in developing countries. New York, St. Martin's Press, 1978. 115 p.

560. SINGH, R.D. Labour migration and its impact on employment and income in a small farm economy. International Labour Review 116(3): 331–341. November–December 1977.

561. SINGH, S.M., YADAVA, R.C. and YADAVA, K.N.S. A study on the fertility of migrants. Health and Population—Perspectives and Issues 4(1): 59–65. January–March 1981.

*562. SIRAGELDIN, I., SOCKNAT, J.; BIRKS, S., LI, B., and SINCLAIR, C. Manpower and international labor migration in the Middle East and North Africa. Washington, D.C. World Bank, 1982. 303 p.

*563. SJAASTAD, L.A. The costs and returns of human migration. Journal of Political Economy 70(Suppl. 5, Pt. 2): 80–93. October 1962.

564. SKELDON, R. The evolution of migration patterns during urbanization in Peru. Geographical Review 67: 394–411. 1977.

565. SMART, J.E. Saudi demand for Filipino workers: labor migration issues in the Middle East. Asian and Pacific Census Forum 9(1): 1–2, 10–13. August 1982.

566. SMITH, M.L. The female domestic servant and social change: Lima, Peru. In: Schaedel, R.P., Hardoy, J.E., and Kinzer, N.S., eds. Urbanization in the Americas from its beginnings to the present. The Hague, Netherlands, Mouton, 1978. p. 569–585.

567. SNYDER, F.G. and SAVANE, M.-A. Law and population in Senegal: a survey of legislation. Leiden, Netherlands, Afrika-Studiecentrum, 1977. 242 p.

568. SOJA, E.W. and WEAVER, C.E. Urbanization and underdevelopment in East Africa. In: Berry, B.J.L., ed. Urbanization and counter-urbanization. Beverly Hills, California, Sage, 1976. (Urban Affairs Annual Reviews Vol. 11) p. 233–266.

569. SOMBUTSIRI, V.C. Hinterland provinces in relation to migration to Bangkok. [Doctoral dissertation, Northwestern Oklahoma State University, May 1980] Ann Arbor, Michigan, University Microfilms, 1983. (No. 8027217) 89 p.

570. SONGRE, A., SAWADOGO, J.-M., and SANOGOH, G. Réalités et effets de l'émigration massive des Voltaiques dans le contexte de l'Afrique Occidentale. [The mass emigration of Upper Volta citizens in West Africa: facts and effects.][FRE, summary in ENG] In: Amin, S., ed. Modern migrations in Western Africa. London, Oxford University Press, 1974. p. 386–406.

571. SOULSBY, J.A. Malawi regional policy and population redistribution: the effect of government locational decisions. [Abstract] In: Clarke, J.I. and Kosinski, L.A., eds. Population redistribution in Africa: proceedings of the symposium in Zaria, Nigeria. Edmonton, Alberta, Canada, International Geographical Union, Commission on Population Geography, 1978. p. 51.

572. SOVANI, N.V. The analysis of "over-urbanization." Economic Development and Cultural Change 12(2): 113–122. January 1964.

573. STAHL, C.W. International labour migration and international development. Geneva, International Labour Office, January 1982. 70 p.

*574. STAHL, C.W. Labor emigration and economic development. International Migration Review 16(4): 869–899. Winter 1982.

575. STAMBOULI, F. Aspects of urban immigrant society in the Maghreb. In: Rivlin, H.A.B. and Helmer, K., eds. The changing Middle Eastern city. Binghamton, State University of New York, Center for Social Analysis and Program in Southwest Asian and North African Studies, 1980. p. 17–33.

*576. STANDING, G. Conceptualising territorial mobility in low-income countries. Geneva, International Labour Office, July 1982. 50 p.

*577. STANDING, G. Contrived stagnation, migration and the state in Guyana. In: Peek, P. and Standing, G., eds. State policies and migration: studies in Latin America and the Caribbean. London, Croom Helm, 1982. p. 251–319.

578. STANDING, G. and SUKDEO, F. Labour migration and development in Guyana. International Labour Review 116(3): 303–313. November–December 1977.

*579. STARK, O. The asset demand for children during agricultural modernization. Population and Development Review 7(4): 671–675. December 1981.

580. STARK, O. Economic-demographic interactions in agricultural development: the case of rural-to-urban migration. Rome, Food and Agriculture Organization of the United Nations, 1978. (Population and Agricultural Development: Selected Relationships and Possible Planning Uses Technical Paper No. 6) (ES:DP/INT/73/P02) 162 p.

*581. STARK, O. On slowing metropolitan city growth. Population and Development Review 6(1): 95–102. March 1980.

*582. STARK, O. On the role of urban-to-rural remittances in rural development. Journal of Development Studies 16(1): 369–374. October 1979.

*583. STARK, O. Research on rural-to-urban migration in LDCs: the confusion frontier and why we should pause to rethink afresh. World Development 10(1): 63–70. January 1982.

584. STARK, O. Rural-to-urban migration in LDCs: a relative deprivation approach. [January 1983]. 21 p. (To be published in Economic Development and Cultural Change)

585. STARK, O. Towards a theory of remittances in LDCs. Cambridge, Massachusetts, Harvard Institute of Economic Research, March 1983. (Discussion Paper No. 971) 27 p.

*586. STARK, O. and LEVHARI, D. On migration and risk in LDCs. Economic Development and Cultural Change 31(1): 191–196. October 1982.

587. STARK, O. and YITZHAKI, S. Migration, growth, distribution and welfare. Economics Letters 10(3–4): 243–249. 1982.

588. STEARMAN, A.M. Colonization in eastern Bolivia: problems and prospects. Human Organization 32(3): 285–293. Fall 1973.

589. STEARMAN, A.M. Migrantes andinos en el oriente boliviano: el caso de Santa Cruz. [Andean migrants in East Bolivia: the case of Santa Cruz.][SPA, summary in ENG] America Indigena 39(2): 381–400. April–June 1979.

*590. STERN, C. Industrialisation and migration in Mexico. In: Peek, P. and Standing, G., eds. State policies and migration: studies in Latin America and the Caribbean. London, Croom Helm, 1982. p. 173–205.

591. STERN, C. and CORONA, R. Implications of the imbalance in age and sex composition of sub-areas as a consequence of migration: the case of Mexico. [ENG, summary in FRE] In: International Population Conference. Vol. 2. (Papers of the 19th General Conference of the International Union for the Scientific Study of Population) Liège, Belgium, Ordina Editions, [1981]. p. 365–386.

592. STERNSTEIN, L. Thailand: migration and regional development: the Khon Kaen Development Centre. In: Pryor, R.J., ed. Migration and development in South-East Asia: a demographic perspective. Kuala Lumpur, Malaysia, Oxford University Press, 1979. p. 59-68.

593. STIER, F. Migration in West Africa and development: a review of recent research. West Lafayette, Indiana, Purdue University, February 1982. (Social Research Institute Publication No. 3) 199 p.

594. STONE, K.H. Third World settlement frontiers: modest population absorbers. GeoJournal 2(3): 193–202. 1978.

*595. STREN, R. Urban policy and performance in Kenya and Tanzania. Journal of Modern African Studies 13(2): 267–294. June 1975.

596. STREN, R.E. Urban inequality and housing policy in Tanzania: the problem of squatting. Berkeley, University of California, 1975. 112 p.

597. SUDAN. MINISTRY OF NATIONAL PLANNING. DEPARTMENT OF STATISTICS. The Sudan fertility survey 1979. Principal report. Vol. 1. Khartoum, Department of Statistics, 1982. (World Fertility Survey) 244 p.

*598. SUNDQUIST, J.L. Dispersing population: what America can learn from Europe. Washington, D.C., Brookings Institution, 1975. 290 p.

599. SURI, K.B. Agricultural change, population redistribution and urban growth. In: Rele, J.R. and Jain, M.K., eds. Population change and rural development in India. Deonar, Bombay, International Institute for Population Studies, 1978. p. 260-267.

*600. SWAMY, G. International migrant workers' remittances: issues and prospects. Washington, D.C., World Bank, 1981. (World Bank Staff Working Paper No. 481) 64 p.

601. SWANSON, J.C. The consequences of emigration for economic development: a review of the literature. Papers in Anthropology 20(1): 39–56. Spring 1979.

*602. SWANSON, J.C. Emigration and economic development: the case of the Yemen Arab Republic. Boulder, Colorado, Westview Press, 1979. 108 p.

603. TANFER, K. Internal migration in Turkey: socioeconomic characteristics by destination and type of move, 1965–1970. Presented at the Annual Meeting of the Population Association of America, Denver, Colorado, April 10–12, [illegible] 40 p.

604. TAYLOR, R.C. Migration and motivation: a study of determinants and types. In: Jackson, J.A., ed. Migration. Cambridge, England, Cambridge University Press, 1969. p. 99–130.

605. THADANI, V.N. and TODARO, M.P. Female migration in developing countries: a framework for analysis. New York, Population Council, August 1979. (Center for Policy Studies Working Paper No. 39) 48 p.

606. THAILAND. TASK FORCE FOR THE PLANNING OF WOMEN'S DEVELOPMENT. Data book on development planning for women (Extracts [Tables] from papers presented at the Seminar on the Present-Status of Thai Women, September 6–9, 1978). Bangkok, United Nations Asian and Pacific Development Institute, August 1978. (DPW/A/5) 74 p.

607. THOMAS, B. The Hispanic immigration wave in historical perspective. Berkeley, University of California, Institute of International Studies, May 1981. (Program in Population Working Paper) 25 p.

608. TIENDA, M. Familism and structural assimilation of Mexican immigrants in the United States. International Migration Review 14(3): 383–408. Fall 1980:

*609. TODARO, M.P. Internal migration in developing countries. Geneva, International Labour Office, 1976. 106 p.

*610. TODARO, M.P. A model of labor migration and urban unemployment in less developed countries. American Economic Review 59(1): 138–148. March 1969.

611. TODARO, M.P. Urbanization in developing nations: trends, prospects, and policies. New York, Population Council, November 1979. (Center for Policy Studies Working Paper No. 50) 28 p.

*612. TODARO, M.P. and STILKIND, J. City bias and rural neglect: the dilemma of urban development. New York, Population Council, 1981. (Public Issues Paper PI-04) 93 p.

613. TOMASI, S.M. Sociopolitical participation of migrants in the receiving countries. In: Kritz, M.M., Keely, C.B., and Tomasi, S.M., eds. Global trends in migration: theory and research on international population movements. Staten Island, Center for Migration Studies of New York, 1981. p. 320–337.

614. TROUVE, J. and BESSAT, C. Les migrations rurales voltaiques: saignée ou facteur de developpement national? [Rural migration in Upper Volta: does it sap or nourish national development?][FRE] In: Gaude, J., ed. Phénomène migratoire et politiques associées dans le contexte africain: études de cas en Algérie, au Burundi, en République-Unie du Cameroun et en Haute-Volta. Geneva, International Labour Office, 1982. p. 239–289.

615. TSAY, C.-L. Employment and earnings of city-ward migrants: a study on individual outcomes of migration to Taipei. Doctoral dissertation, [Brown University], Providence, Rhode Island, September 1979. 246 p.

616. TSAY, C.-L. Migration and population growth of Taipei Municipality, 1968–1973. March 1979. 29 p. (Unpublished)

617. TURNER, F.C. The rush to the cities in Latin America: government policies have more effect than we recognize. Habitat 2(1–2): 189–203. 1977.

618. TURNER, J.F.C. Uncontrolled urban settlement: problems and policies. In: Breese, G.W., ed. The city in newly developing countries: readings on urbanism and urbanization. Englewood Cliffs, New Jersey, Prentice-Hall, 1969. p. 507–534.

*619. UDALL, A.T. Transport improvements and rural outmigration in Colombia. Economic Development and Cultural Change 29(3): 613–629. April 1981.

620. UDO, R.K. Migration and urbanization in Nigeria. In: Caldwell, J.C., ed. Population growth and socioeconomic change in West Africa. New York, Columbia University Press, 1975. p. 298–307.

621. UNITED NATIONS (UN). DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS. Methods of measuring internal migration. New York, UN, 1970. (Population Studies No. 47) 72 p.

622. UNITED NATIONS (UN). DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS. Trends and characteristics of international migration since 1950. New York, UN, 1979. (Demographic Studies No. 64, ST/ESA/SER.A/64) 172 p.

623. UNITED NATIONS (UN). DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS. World population trends and policies: 1977 monitoring report. Vol. 1. Population trends. New York, UN, 1979. (Population Studies No. 62, ST/ESA/SER.A/62/Add.1) 279 p.

624. UNITED NATIONS (UN). DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS. World population trends and policies: 1977 monitoring report. Vol. 2. Population policies. New York, UN, 1979. (Population Studies No. 62, ST/ESA/SER.A/62) 140 p.

625. UNITED NATIONS (UN). DEPARTMENT OF INTERNATIONAL ECONOMIC AND SOCIAL AFFAIRS. Demographic yearbook 1977. Annuaire démographique 1977. [ENG, FRE] New York, UN, 1978. 1024 p.

626. UNITED NATIONS (UN). DEPARTMENT OF INTERNATIONAL ECONOMIC AND SOCIAL AFFAIRS. Demographic yearbook 1979. Annuaire démographique 1979. [ENG, FRE] New York, UN, 1980. 1135 p.

*627. UNITED NATIONS (UN). DEPARTMENT OF INTERNATIONAL ECONOMIC AND SOCIAL AFFAIRS. Estimates and projections of urban, rural and city populations, 1950–2025: the 1980 assessment. New York, UN, 1982. 94 p.

*628. UNITED NATIONS (UN). DEPARTMENT OF INTERNATIONAL ECONOMIC AND SOCIAL AFFAIRS. International migration policies and programmes: a world survey. New York, UN, 1982. (Population Studies No. 80) 111 p.

*629. UNITED NATIONS (UN). DEPARTMENT OF INTERNATIONAL ECONOMIC AND SOCIAL AFFAIRS. Patterns of urban and rural population growth. New York, UN, 1980. (Population Studies No. 68) 175 p.

*630. UNITED NATIONS (UN). DEPARTMENT OF INTERNATIONAL ECONOMIC AND SOCIAL AFFAIRS. Population distribution policies in development planning. New York, UN, 1981. (Population Studies No. 75) 206 p.

631. UNITED NATIONS (UN). DEPARTMENT OF INTERNATIONAL ECONOMIC AND SOCIAL AFFAIRS. Recommendations on statistics of international migration. New York, UN, 1980. (Statistical Papers Series M. No. 58) 73 p.

632. UNITED NATIONS (UN). DEPARTMENT OF INTERNATIONAL ECONOMIC AND SOCIAL AFFAIRS. Statistics of international migration. In: Demographic yearbook 1977. New York, UN, 1978. p. 3–16.

633. UNITED NATIONS (UN). DEPARTMENT OF INTERNATIONAL ECONOMIC AND SOCIAL AFFAIRS. Variations in the incidence of knowledge and use of contraception: a comparative analysis of World Fertility Survey results for twenty developing countries. New York, UN, 1981. (ST/ESA/SER.R/40) 161 p.

634. UNITED NATIONS (UN). DEPARTMENT OF INTERNATIONAL ECONOMIC AND SOCIAL AFFAIRS. World population trends and policies: 1981 monitoring report. Vol. 1. Population trends. New York, UN, 1982. (Population Studies No. 79) 253 p.

635. UNITED NATIONS (UN). DEPARTMENT OF INTERNATIONAL ECONOMIC AND SOCIAL AFFAIRS. World population trends and policies: 1981 monitoring report. Vol. 2. Population policies. New York, UN, 1982. (Population Studies No. 79, ST/ESA/SER.A/79/Add.1) 196 p.

636. UNITED NATIONS. DEPARTMENT OF INTERNATIONAL ECONOMIC AND SOCIAL AFFAIRS. POPULATION DIVISION. International migration policies and programmes: the view since Bucharest. (Prepared for Expert Group Meeting on Population Distribution, Migration and Development, Hammamet, Tunisia, March 21–25, 1983) [New York, UN], February 9, 1982. (IESA/P/ICP.1984/EG.II/20) 32 p.

*637. UNITED NATIONS. DEPARTMENT OF INTERNATIONAL ECONOMIC AND SOCIAL AFFAIRS. POPULATION DIVISION. Population distribution, migration and development: highlights of the issues in the context of the World Population Plan of Action. (Prepared for Expert Group Meeting on Population Distribution, Migration and Development, Hammamet, Tunisia, March 21–25, 1983) [New York, UN], February 4, 1983. (IESA/P/ICP.1984/EG.II/3) 36 p.

638. UNITED NATIONS. DEPARTMENT OF INTERNATIONAL ECONOMIC AND SOCIAL AFFAIRS. POPULATION DIVISION. Strategies and instruments of population distribution policies: comparative experiences in developing countries. (Prepared for Expert Group Meeting on Population Distribution, Migration and Development, Hammamet, Tunisia, March 21–25, 1983) [New York, UN], February 9, 1982. (IESA/P/ICP.1984/EG.II/21) 51 p.

639. UNITED NATIONS (UN). ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC (ESCAP). Comparative study on migration, urbanization and development in the ESCAP region. Bangkok, ESCAP, Population Division, 1982. (RAS/P13/79, No. 6) 36 p.

*640. UNITED NATIONS (UN). ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC (ESCAP). Migration urbanization and development in Indonesia. New York, UN, 1981. (ST/ESCAP/169) (Comparative Study on Migration, Urbanization and Development in the ESCAP Region, Country Report) 202 p.

*641. UNITED NATIONS (UN). ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC (ESCAP). POPULATION DIVISION. Migration, urbanization and development in the Republic of Korea. Bangkok, ESCAP, 1980. (Comparative Study of Migration, Urbanization in Relation to Development in the ESCAP Region, Country Report No. 1) 142 p.

*642. UNITED NATIONS (UN). ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC (ESCAP). Migration, urbanization and development in Sri Lanka. New York, UN, 1980. (Comparative Study on Migration, Urbanization and Development in the ESCAP Region. Country Report; ST/ESCAP/94) 143 p.

*643. UNITED NATIONS (UN). ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC. Migration, urbanization and development of Thailand. New York, UN, 1982. (Comparative Study on Migration, Urbanization and Development in the ESCAP Region, Country Report; ST/ESCAP/211) 163 p.

644. UNITED NATIONS (UN). ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC. National migration surveys: 2. The core questionnaire. New York, UN, 1980. 31 p.

645. UNITED NATIONS (UN). ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC (ESCAP). Population of Sri Lanka. Bangkok, UN, 1976. (ESCAP Country Monograph Series No. 4; ST/ESCAP/30) 397 p.

646. UNITED NATIONS. POPULATION DIVISION. and UNITED NATIONS FUND FOR POPULATION ACTIVITIES. Colombia. Population Policy Compendium, January 1981. 6 p.

647. UNITED NATIONS. POPULATION DIVISION. and UNITED NATIONS FUND FOR POPULATION ACTIVITIES. Cuba. Population Policy Compendium, September 1979. 6 p.

648. UNITED NATIONS. POPULATION DIVISION. and UNITED NATIONS FUND FOR POPULATION ACTIVITIES. Venezuela. Population Policy Compendium, February 1982. 7 p.

*649. UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION (UNESCO). Policy implications of research on internal and international migration: issues and priority areas. (Prepared for Expert Group Meeting on Population Distribution, Migration and Development, Hammamet, Tunisia, March 21–25, 1983) [New York, UN], January 17, 1983. (IESA/P/ICP.1984/EG.II/16) 16 p.

650. UNITED NATIONS HIGH COMMISSIONER FOR REFUGEES. International migration: refugees. (Prepared for Expert Group Meeting on Population Distribution, Migration and Development, Hammamet, Tunisia, March 21–25, 1983) [New York, UN], March 3, 1983. (IESA/P/ICP.1984/EG.II/27) 9 p.

651. UNITED STATES. BUREAU OF THE CENSUS. A compilation of age-specific fertility rates for developing countries. Washington, D.C., U.S. Government Printing Office, December 1979. (International Research Document No. 7; ISP-RD-7) 154 p.

652. UNITED STATES. LIBRARY OF CONGRESS. CONGRESSIONAL RESEARCH SERVICE. Selected readings on U.S. immigration policy and law: a compendium. [Committee print. 96th Congress. 2nd Session] Washington, D.C., U.S. Government Printing Office, October 1980. 494 p.

*653. U.S. COMMITTEE FOR REFUGEES. World Refugee Survey 1982. [New York], American Council for Nationalities Service, 1982. 63 p.

654. U.S. COMMITTEE FOR REFUGEES (USCR). World Refugee Survey 1983. Washington, D.C., USCR, 1983. 76 p.

655. USANDIZAGA, E. and HAVENS, A.E. Tres barrios de invasión: estudio de nivel de vida y actitudes en Barranquilla. [Three barrios that resulted from inmigration: a study of the standard of living and attitudes in Barranquilla.][SPA] Bogotá, Colombia, Ediciones Tercer Mundo and Universidad Nacional, Facultad de Sociología, 1966. 94 p.

656. VAIDYANATHAN, K.E. Metropolitan population growth in Arab countries. Egyptian Population and Family Planning Review 11(1–2): 1–37. June–December 1977.

657. VAN ARSDOL, M.D., Jr., YOUSSEF, N., ANTOCHIW, M., BERG, D., and BRENNAN, J., Jr. Migration and population redistribution in the State of Mexico. In: Smithsonian Institution. Interdisciplinary Communications Program. The dynamics of migration: internal migration and migration and fertility. Washington, D.C., Smithsonian Institution, December 1976. (Occasional Monograph Series No. 5, Vol. 1) p. 133–176.

658. VETTER, D.M. and BRASILEIRO, A.M. Toward a development strategy for Grande Rio de Janeiro. In: Cornelius, W.A. and Kemper, R.V., eds. Latin American urban research, Vol. 6. Metropolitan Latin America: the challenge and the response. Beverly Hills, California, Sage, 1978. p. 259–278.

659. VILLEY, O. Les effets directs de l'immigration sur les finances des administrations publiques. [The direct effects of immigration on the finances of governmental agencies.] [FRE] Revue Française des Affaires Sociales 32(Special issue): 71–80. April–June 1978.

660. VINING, D.R., Jr. and KONTULY, T. Population dispersal from major metropolitan regions: an international comparison. International Regional Science Review 3(1): 49–73. Fall 1978.

661. VISARIA, P.M. Urbanization, migration, and fertility in India. In: United States. National Institutes of Health (NIH). The family in transition. Bethesda, Maryland, NIH, 1969. (Fogarty International Center Proceedings No. 3) p. 257–283.

662. WANDER, H. The role of international migration in the changing pattern of economic, social and demographic structure in Europe. In: Macura, M., ed. The effect of current demographic change in Europe on social structure. (Proceedings of the 3rd European Population Seminar, Beograd, Yugoslavia, September 26–29, 1978) Beograd, Yugoslavia, Ekonomski Institut, 1979. p. 27–31.

663. WARD, A. European migratory labor: a myth of development. Monthly Review 27(7): 24–38. December 1975.

664. WARDLAW, T., WAY, A., and SMITH, L. Comparison of results of Contraceptive Prevalence Surveys in five countries. Columbia, Maryland, Westinghouse Health Systems, [1980]. 35 p. (Mimeo)

665. WARREN, R. and PASSEL, J.S. Estimates of illegal aliens from Mexico counted in the 1980 United States census. Presented at the 52nd Annual Meeting of the Population Association of America, Pittsburgh, Pennsylvania, April 14–16, 1983. 26 p.

666. WASOW, B. The working age sex ratio and job search migration in Kenya. Journal of Developing Areas 15(3): 434–444. April 1981.

667. WAWER, M. [Johns Hopkins University] [Family planning for migrants in Rio de Janeiro] Personal communication, May 5, 1983.

668. WAWER, M.J., GRAY, R.H., BARRETT, J.C., and JOZAN, P. Migration and health: contribution of the World Health Organization Secretariat. February 15, 1983. 52 p. (Unpublished)

669. WEINBERG, I. The problem of the convergence of industrial societies: a critical look at the state of a theory. Comparative Studies in Society and History 11(1): 1–15. January 1969.

*670. WEINER, M. International relations and domestic political consequences of international labor migrations. Presented at the 52nd Annual Meeting of the Population Association of America, Pittsburgh, Pennsylvania, April 14–16, 1983. 36 p.

671. WEINER, M. The political demography of Assam's anti-immigrant movement. Population and Development Review 9(2): 279–292. June 1983.

672. WEITZ, R., ed. Special problems of urbanization. In: Urbanization and the developing countries: report on the Sixth Rehovot Conference. New York, Praeger, 1973. p. 66–86.

*673. WEITZ, R. Urbanization and economic growth. In: Urbanization and the developing countries: report on the Sixth Rehovot Conference. New York, Praeger, 1973. p. 17–37.

674. WELLER, R.H. and MACISCO, J.J., Jr. Migration, aspirations for social mobility, and fertility in developing countries: suggestions for further research. Providence, Rhode Island, Brown University, Population Research and Training Center, 1970. 43 p. (Mimeo)

675. WELLISZ, S.H. Economic development and urbanization. In: Jakobson, L. and Prakash, V., eds. Urbanization and national development. Vol. 1. South and Southeast Asia urban affairs annual. Beverly Hills, California, Sage, 1971. p. 39–55.

676. WERNER, H. Some current topics of labour migration in Europe: some past facts and figures. International Migration 12(4): 300–307. 1974.

677. WERTH, M. and YALCINTAS, N. Migration and re-integration: transferability of the Turkish model of return migration and self-help organisations to other Mediterranean labour-exporting countries. Geneva, International Labour Organisation, June 1978. (World Employment Programme Working Paper No. WEP 2–26/WP 29) 46 p.

678. WHITE, J.W. Dimensions of cycles in internal migration. In: White, J.W., ed. The urban impact of internal migration. Chapel Hill, University of North Carolina, Institute for Research in Social Science, 1979. (Comparative Urban Studies Project Monograph No. 5) p. 149–173.

679. WILLIAMS, J.B. Sadikin closes Jakarta. Insight, February 1973. p. 16–20.

680. WOLOWYNA, O. Rural-urban migration and fertility: a simulation model. [Doctoral dissertation, Brown University, June 1979] Ann Arbor, Michigan, University Microfilms, 1983. 188 p.

681. WORLD BANK. World tables: second edition [1980]. Baltimore, Johns Hopkins University Press, 1980. 474 p.

682. WORLD POPULATION CONFERENCE. World population plan of action. Washington, D.C., U.S. Agency for International Development, August 1976. 44 p.

*683. YAP, L.Y.L. The attraction of cities: a review of the migration literature. Journal of Development Economics 4(3): 239–264. September 1977.

684. YEH, S.H.K. Housing the urban poor in Southeast Asia: some trends and prospects. January 1982. 24 p. (Unpublished)

685. YODER, M.L. and FUGUITT, G. Urbanization, frontier growth, and population redistribution in Brazil. Luso-Brazilian Review 16(1): 67–90. 1979.

*686. YOUSSEF, N., BUVINIC, M., KUDAT, A., SEBSTAD, J., and VON ELM, B. Women in migration: a Third World focus. Washington, D.C., International Center for Research on Women, June 1979. (AID/otr-G-1592) 170 p.

687. YUSUF, F. and RETHERFORD, R.D. Urban-rural fertility differentials in Pakistan. Journal of Biosocial Science 13(4): 491–499. October 1981.

688. ZACHARIAH, K.C. Bombay migration study: a pilot analysis of migration to an Asian metropolis. Demography 3(2): 378–392. 1966.

689. ZACHARIAH, K.C. Measurement of internal migration from census data. In: Brown, A.A. and Neuberger, E., eds. Internal migration: a comparative perspective. New York, Academic Press, 1977. p. 121–134.

690. ZACHARIAH, K.C. Migration in the Ivory Coast. In: Zachariah, K.C., Condé, J., and Nair, N.K. Demographic aspects of migration in West Africa: Vol. 2. Washington, D.C., World Bank, September 1980. (World Bank Staff Working Paper No. 415) p. I.C.1–166.

691. ZACHARIAH, K.C. Sex-age pattern of population mobility in the U.A.R. with some international comparisons. Egyptian Population and Family Planning Review 3(2): 49–58. June 1970.

692. ZACHARIAH, K.C. and CONDE, J. International migration in West Africa: demographic and economic aspects. [ENG, summary in FRE] In: International Union for the Scientific Study of Population (IUSSP). Economic and demographic change: issues for the 1980's. Proceedings of the Conference, Helsinki, Finland, 1978. Vol. 3. Liège, Belgium, IUSSP, 1979. p. 237–247.

*693. ZACHARIAH, K.C. and CONDE, J. Migration in West Africa: demographic aspects. New York, Oxford University Press, 1981. 130 p.

*694. ZÁRATE, A. and UNGER DE ZÁRATE, A. On the reconciliation of research findings of migrant-nonmigrant fertility differentials in urban areas. International Migration Review 9(2): 115–156. Summer 1975.

*695. ZELINSKY, W. The demographic transition: changing patterns of migration. [ENG, summary in FRE] In: International Union for the Scientific Study of Population (IUSSP). Population science in the service of mankind. Proceedings of the Conference of Science in the Service of Life, Vienna, Austria, July 1979. Liège, Belgium, IUSSP, 1979. p. 165–189.

*696. ZELINSKY, W. The hypothesis of the mobility transition. Geographical Review 61: 219–249. April 1971.

697. ZELINSKY, W. The impasse in migration theory: a sketch map for potential escapees. In: Morrison, P.A., ed. Population movements: their forms and functions in urbanization and development. Liège, Belgium, Ordina Editions, 1983. p. 19–46.

ADDENDA

698. GROSSE, S.D. Rural development and rural-urban migration: the elusive relationship. Ann Arbor, Michigan, University of Michigan, Center for Population Planning, June 1983. 72 p. (Mimeo)

699. KORCELLI, P. Integration of the spatial population size distribution into population development modeling. (Prepared for UN/UNFPA Expert Group Meeting on Population-Development Modeling, Geneva, September 24–28, 1979) [New York, UN], 1979. (IESA/P/C.13/7) 12 p.

*700. LATTES, A.E. Territorial mobility and redistribution of the population. (Prepared for Expert Group Meeting on Popuation Distribution, Migration and Development. Hammamet, Tunisia, March 21–25, 1983. [New York, UN], December 1982. (IESA/P/ICP.1984/EG.II/4) 11 p.

701. LEVY, M.B. and WADYCKI, W.J. The influence of family and friends on geographic labor mobility: an international comparison. Review of Economics and Statistics 55(2): 198–203. May 1973.

702. MAGNANI, R.J., HAWLEY, A.H., and SHUCHMAN, C.K. Migrant-nonmigrant fertility differentials in Bangkok, Thailand and Bogota, Colombia. Chapel Hill, University of North Carolina, Carolina Population Center, 1979. 35 p. (Mimeo)

703. MCGREEVEY, W.P. Urban growth in Colombia. Journal of Interamerican Studies and World Affairs 16(4): 387–408. November 1974.

704. MORRISON, P.A. Emerging public concerns over U.S. population movements in an era of slowing growth. In: Espenshade, T.J. and Serow, W.J., eds. The economic consequences of slowing population growth. New York, Academic Press, 1978. p. 225–246.

705. OGUNODE, F.A. Guidelines for the Fourth Development Plan and population policy for the 1980s. In: Chojnacka, H., Olusanya, P.O., and Ojo, F., eds. Population and economic development in Nigeria in the nineteen eighties. (Proceedings of a National Workshop held at the University of Lagos, September 12–14, 1979) New York, United Nations Department of Technical Co-operation for Development, 1981. (TCD/SEM.81/2) p. 193–208.

706. OKITA, S., KURODA, T., YASUKAWA, M., OKAZAKI, Y., and ITO, K. Population and development: the Japanese experience. In: Hauser, P.M., ed. World population and development: challenges and prospects. Syracuse, New York, Syracuse University Press, 1979. p. 296–338.

707. SALAS, R.M. The state of world population 1983. New York, United Nations Fund for Population Activities, 1983. 8 p.

708. VINING, D., PALLONE, R., and PLANE, D. Recent migration patterns in the developed world: a clarification of some differences between our and IIASA's findings. Environment and Planning A 13(2): 243–250. 1981.

709. WELLER, R.H. Fertility and international migration in the Arab Middle East. Presented at the Economic Commission for Western Asia Migration in the Arab World, Nicosia, Cyprus, May 11–16, 1981. 31 p.

710. ZAHLAN, A. The Arab brain drain. Population Bulletin of the United Nations Economic Commission for Western Asia, No. 16, June 1979. p. 19–38.

Migrants' squatter settlements contrast with modern apartment buildings in France. (ILO)

POPLINE

POPLINE, a computerized literature search service, offers bibliographic citations and abstracts on any specific subject or field of interest from a collection of more than 100,000 documents covering all aspects of family planning and population. **In developing countries**, searches can be obtained **free of charge** by writing to either of the organizations listed below. **In the United States**, users can subscribe to **POPLINE** through the National Library of Medicine (NLM), Bethesda, MD 20209. **POPLINE** is already available at over 1,800 institutions designated as search centers of the NLM MEDLARS system. **In other developed countries**, searches can be obtained through MEDLARS search centers or, in countries with no access to MEDLARS, through either of the institutions listed below. In developed countries, searches are free to persons employed by international development and training institutions; others may be charged.

POPLINE is produced by the Population Information Program of the Johns Hopkins University, the Library/Information Program of the Center for Population and Family Health of Columbia University, and *Population Index* of Princeton University, in cooperation with the US National Library of Medicine and with financial support from the US Agency for International Development and also from the National Institute of Child Health and Human Development.

To request a search, please complete the following form:

Search topic: ____________________

Last name: ____________________ First Name: ____________________

Organization: ____________________

Address: ____________________

City: ____________________ Postal Code: __________ Country: ____________________

Mail this form to either
of these addresses ⟶
Services to
developing countries
free of charge.

Population Information Program
Attn: POPLINE
The Johns Hopkins University
624 North Broadway
Baltimore, Maryland 21205, USA

Center for Population and Family Health
Attn: POPLINE
Columbia University
60 Haven Avenue
New York, New York 10032, USA

RECENT POPULATION REPORTS

ORAL CONTRACEPTIVES—Series A

___ A-5, OCs—Update on Usage, Safety, and Side Effects *(A, F, P, S)*
___ A-6, Oral Contraceptives in the 1980s *(F, P, S)*

INTRAUTERINE DEVICES—Series B

___ B-3, IUDs—Update on Safety, Effectiveness, and Research *(F, P, S)*
___ B-4, IUDs: An Appropriate Choice for Many Women *(F, P, S)*

STERILIZATION, FEMALE—Series C

___ C-8, Reversing Female Sterilization *(F, P, S)*

LAW AND POLICY—Series E

___ E-6, Legal Trends and Issues in Voluntary Sterilization *(F, P, S)*

BARRIER METHODS—Series H

___ H-5, Spermicides—Simplicity and Safety are Major Assets *(F, P, S)*
___ H-6, Update on Condoms—Products, Protection, Promotion *(F, P, S)*

PERIODIC ABSTINENCE—Series I

___ I-3, Periodic Abstinence: How Well Do New Approaches Work? *(F, P, S)*

FAMILY PLANNING PROGRAMS—Series J

___ J-19, Community-Based and Commercial Contraceptive Distribution *(A, F, P, S)*
___ J-20, Filling Family Planning Gaps *(F, P, S)*
___ J-21, Social Marketing: Does It Work? *(F, P, S)*
___ J-22, Traditional Midwives and Family Planning *(F, P, S)*
___ J-23, Films for Family Planning Programs *(F, P, S)*
___ J-24, Breast-Feeding, Fertility, and Family Planning *(F, P, S)*
___ J-25, Population and Birth Planning in the People's Republic of China *(F, P, S)*
___ J-26, Sources of Population and Family Planning Assistance

INJECTABLES AND IMPLANTS—Series K

___ K-2, Long-Acting Progestins—Promise and Prospects

ISSUES IN WORLD HEALTH—Series L

___ L-1, Tobacco—Hazards to Health and Human Reproduction *(A, F, P, S)*
___ L-2, Oral Rehydration Therapy for Childhood Diarrhea *(A, F, P, S)*
___ L-3, Community-Based Health and Family Planning
___ L-4, Infertility and Sexually Transmitted Disease: A Public Health Challenge

SPECIAL TOPICS—Series M

___ M-2, Voluntary Sterilization: World's Leading Contraceptive Method *(A, F, P, S)*
___ M-3, The World Fertility Survey—Current Status and Findings *(A, F, P, S)*
___ M-4, Age at Marriage and Fertility *(F, P, S)*
___ M-5, Contraceptive Prevalence Surveys: A New Source of Family Planning Data *(F, P, S)*
___ M-6, Population Education in the Schools *(F, P, S)*
___ M-7, Migration, Population Growth, and Development

INDEX

___ Index 1972–1977 (to English edition only)
___ Index 1978–1980 (to English edition only)

Population Information Program
The Johns Hopkins University
624 North Broadway, Baltimore, Maryland 21205, USA

1. Recent **Population Reports** are listed above. Check (✓) the issues you want to order in the spaces provided. **Population Reports** are free in any quantity to developing countries. In USA and other developed countries, multiple copies are $.50 each; full set of reports in print, $20.00; with binder, $25.00. Send payment in US$ with order.
2. All publications appear in English. Many are available in Arabic, French, Portuguese, and Spanish, as the abbreviations after each title indicate. Check the language you prefer: Arabic ☐, English ☐, French ☐, Portuguese ☐, Spanish ☐
3. Please type or print your name and mailing address clearly.

Last name ______________ First name ______________

Organization ______________________________

Address ______________________________

City ______________ Postal Code ______________

Country ______________________________

4. Please check appropriate box or boxes:

☐ Send ______ copies of each future issue of **Population Reports.**

☐ I am already on the **Population Reports** mailing list.

☐ Please send me a binder (in developed countries, $5.00 for binder only).

☐ I do not want to receive **Population Reports** regularly.

5. Mail to address above.